FACTORS ASSOCIATED WITH ACCIDENTS INVOLVING COMMERCIAL MOTORCYCLE OPERATORS IN MIGORI TOWN, KENYA

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DECLARATION

DECLARATION

Declaration by candidate

This thesis is my original work and has not been presented for a degree in any other University. No part of this thesis may be reproduced without the prior written permission of the author and/or Rongo University.

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DEDICATION

This work is dedicated to my lovely wife Irene, daughter Sherry, son Nolan, siblings: Wycliffe, Robinson, Jackline, Winnie and grandma "*Nyar wuon Otiego"*, and dear parents: Daniel Owino and the late Mercy Owino.

ABSTRACT

Transport services offered by commercial motorcycle operators present a number of advantages to users. The advantages range from affordability to flexibility. Due to shortage of formal employment, many Kenyan youth have ventured into commercial motorcycle taxi business, but the sub sector is facing many challenges key to which is rampant cases of motor accidents. This study explored factors associated with accident involving commercial motorcycle operators in Migori town, Kenya. Specifically, this study sought to: - determine the association between rider formal training and accidents involving commercial motorcycle operators, determine the effect of rider alcohol use on accidents involving commercial motorcycle operators, determine the association between age of rider and accidents involving commercial motorcycle operators and, determine the association between rider compliance with traffic laws and accidents involving commercial motorcycle operators, in the study area. This study employed a descriptive survey design targeting all the commercial motorcycle operators registered with Migori town Motorists Sacco Limited. A simple random sampling technique was used to identify one hundred and ninety five (195) commercial motorcycle operators. In addition, purposive sampling was used to include five (5) key informants in the study. The study was guided with Human Factors Theory. Pretested structured questionnaire was administered to the sampled commercial motorcycle operators to collect quantitative data. Separately, in- depth interviews were conducted to the key informants to gather qualitative data. The quantitative data was coded, sorted and analyzed descriptively using SPSS software. Inferential statistics using Chi – Square and Binary Logistic Regression were used to test associations between independent and dependent variables. A probability value of $p \leq 0.05$ was considered significant. Qualitative data was classified, summarized and analyzed using content analysis approach. The findings were presented in form of tables and narrative forms. Research findings revealed that rider formal training had significant association with motorcycle accident. The study also found that, rider alcohol use, age of rider and rider compliance with traffic laws did not have significant association with motorcycle accident in Migori town. Based on these findings, the study concluded that rider formal training is important in reducing commercial motorcycle related accidents. The study therefore recommended that potential riders should undergo formal training in driving schools as a way of reducing commercial motorcycle accidents. It is during formal training that other issues such as rider alcohol use during working hours and rider compliance with traffic laws, which are found to be insignificantly associated with motorcycle accident in this study, would be taught.

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LIST OF ABBREVIATIONS AND ACRONYMS

ATSB: Australian Transport Safety Bureau

BAC: Blood Alcohol Content

BRTA: Bangladesh Road Transport Authority

CC: County Commissioner

CDE: County Director of Education

CoD: Chair of Department

CWH: Cyclists Wear Helmet

DC: District of Columbia

DF: Degree of Freedom

DHS: Discourage High Speed

IDIs: In - Depth Interviews

KIs: Key Informants

KRB: Kenya Roads Board

M.A: Master of Arts

MOA: Matatu Owners Association

NACOSTI: National Commission of Science for Technology and Innovation

NHTSA: National Highway Traffic Safety Administration

NTSA: National Transport Safety Authority

OR: Odds Ratio

PSV: Public Service Vehicles

PPC: Personal Protective Clothing

RU: Rongo University

RSHC: Road Safety Highway Codes

RTI: Road Transport Injury

S.E: Standard Error

SSATP: Sub – Saharan African Transport Policy

SPSS: Statistical Package for Social Sciences

FARS: Fatal Accident Reporting System

TLB: Transport Licensing Board

UK: United Kingdom

U.S.A: United States of America

V.I.F: Variance Inflation Factor

WHO: World Health Organization

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CHAPTER 1 : INTRODUCTION

1.0 Introduction

This chapter features background of the study, problem statement, and purpose of the study. In addition, research objectives, research questions, scope of the study, limitation of the study, basic assumptions of the study, and justification of the study are outlined. Besides, the chapter carries definition of operational terms, and organization of the study.

1.1 Background of the Study

A 2015 review by World Health Organization (WHO) reported that motorcycle crashes are one of the leading causes of unnatural death worldwide. The report further revealed that, almost half of all deaths on the world's roads are among those with the least protection: motorcycle operators 23 percent, pedestrians 22 percent, and cyclists 4 percent (as cited in Kipngetich, 2017). A study by Bangladesh Road Transport Authority (BRTA) (2012), one of the most vulnerable cities both in terms of total number of accidents and accidents rates is Dhaka (capital city of Bangladesh). A period between 2007 and 2011, a total of 2,720 accidents occurred (BRTA, 2012).

According to National Highway Transport Safety Authority (NHTSA) (2013) in 2008, motorcycles were only about three percent of all registered vehicles and only 0.4 percent of vehicles which travelled miles in United States. It is worthwhile to note that motorcycle fatalities in the United States were 14 per cent of all traffic fatalities in 2008 compared to only 5.92 per cent in 1997. Over the same period, passenger car and light trunk fatality in United States dropped from 26.7 per cent in 1997 to 13.54 per cent in 2008. In 2004

motorcycle fatalities fell 2.3 percent to 4,586 from 4,692 in 2003. This was the noted decrease in motorcycle operators' fatalities since 2009. In 2013, 56 out of every 100,000 registered motorcycles was involved in a fatal crash , compared with only 9 out of every 100,0000 passenger cars, according to the NHTSA(2013). In 2014, motorcycle operators were 27 times more likely than passenger car occupants to die in a crash per vehicle mile travelled, and almost five times more likely to be injured. In 2012, about 328 motorcycle users were killed, which were 9 percent decrease compared to 2011 and 4 percent decrease compared to the average number killed per year from 2005 to 2009 (NHTSA,2014).

The Department of Transport in United Kingdom (UK) generally points to weather patterns as being associated with motorcycle operators' casualty involvement on the basis that motorcycle operators are more likely to be on the road during periods of good weather (Clarke et al., 2004). Although motorcycle operators are less than one percent of vehicle traffic , motorcycle operators suffer up to 14 percent of total deaths and serious injuries and fatalities among road users in many countries due to lack of proper training, riding while they are under age and non-compliance with traffic rules (Edson and Tandoc, 2007).

A study by the Australian Transport Safety Bureau (ATSB) revealed that in Australia the sales of motorcycle have increased consistently in the recent years (Nyatundo, 2014). Risk factors for motorcycle crashes are excessive speed used by motorcycle operators while riding motorcycle, alcohol consumption and abuse of drug during riding period, inexperience, unlicensed riding(Nyatundo,2014). Other motorcycle behaviors that have been cited to be contributing to road crashes and traffic injuries are traffic errors and control errors (Elliot et al., 2007).

Most people in Brazil use motorcycle as means of transport to move around (Cavalcanti et al., 2011). Motorcycles are also used as taxi; this is because the means are relatively cheap compared to others and is accessible to low- income people who use it as locomotion vehicle (Cavalcanti et al., 2011). According to MacLeod et al. (2010) motorcycle accidents are responsible for cause of injuries related to fatalities on Brazilian roads. A number of studies have tried to determine how individual, behavioral, geophysical and situational factors may be associated to the greater involvement of motorcycle operators in traffic accidents (Nunn, 2011; Savolainen & Mannering, 2007; Haquea et al., 2008; Oluwadiyaa et al., 2009; Albalate & Fernandez-Villandogos, 2010).

The use of motorcycle is highly patronized in Africa. In the year 2009; The Federal Road Safety Commission (FRSC) in Nigeria reported that, between the year 2004 and 2005, 52 percent of all motor vehicle license plates were for motorcycles. In 2004 there were 259,757 registered motorcycles while in 2005 the number increased to 263,163 (FRSC, 2009).In Tanzania about 181 lives were claimed due to motorcycle accidents during the first quarter of 2010 (Nkwame, 2010). This is partially due to the rapidly increasing number of motorcycles from 6,700 in 2007 to 85,000 in 2009, a 13 fold increase in the period of 2 years (Nkwame, 2010). During the period between January and June 2010, the Road Safety Committee of Dar es Salaam, reported 64 deaths and 615 casualties due to motorcycle accidents affecting both passengers and riders (Mustapha, 2010).

In Kenya, a study by National Transport Safety Authority (NTSA) (2017) revealed that between 2015 and 2017, over 274,865 motor cycles had been registered in the country; and a total of 1,399 fatalities, 1,956 serious injuries and 634 slightly injured involving motorcycle accidents had been reported. A study by Githinji (2011) noted that, drunken

riding rate is too high. He asserted that, this could be the reason as to why road traffic injuries represent as much as 60 percent of all patients admitted to surgical wards. World Health Organization reported that, between 3,000 and 13,000 Kenyans lose their lives in road traffic crashes annually. The majority of these people are vulnerable road users: motorcycle operators, pedestrians and cyclists. The report further noted that, nearly one – third of deaths are among passengers majority of whom are killed in unsafe forms of public transportation (WHO, 2013; *Global Status Report on Road Safety*). This situation is linked to lack of compliance to traffic laws of helmet wearing, alcohol consumption during riding hours and high riding speed.

In Western Kenya, a study by Nyatundo Onserio V. (2014) on factors affecting accidents rates among commercial motorcycle operators in Kisii town found that a significant relationship between alcohol use and accident involvement, the study also found that, alcohol / drug use by motorcycle operators has link with accident involvement in busy traffic roads. In Migori town, the case is not different very little has been done to curb the situation, perhaps due to lack of observed factual and reliable information on factors associated with motor accidents.

1.2 Problem Statement

Motorcycle related accidents is and remain the major cause of morbidity and mortality among the productive age in the developing world (Solagberu et al., 2006). Motorcycle operators, cyclists and pedestrians are vulnerable road users on the road worldwide. This is as a result of their least protection against road accidents (WHO, 2013). A study by NTSA (2017) revealed that a total of 1,399 fatalities, 1,956 serious injuries and 634 slightly injured cases were reported in Kenya.

Matheka et al. (2015) found that road traffic injuries costs Kenya's economy up to about Ksh. 14 billion annually. The number of reported motorcycle deaths in Kenya has been rising from 44 in 2005 to 394 in 2014 (NTSA, 2014). There is need for preservative measures to alleviate motorcycle related accidents and minimize their consequences in terms of mortality and injuries.

Commercial motorcycle road traffic accidents are linked to rider behavior and actions which are influenced by the environment in which they operate (Nyachieo, 2015). This is because individual's behavior are shaped, influenced and constrained by the environment factors. The motorcycle accidents may be caused by individual behavior factors; these behaviors are influenced by other factors outside the individual sphere which leads to accidents. The outside factors are among others; traffic congestion, poor mechanical maintenance of motor cycles, bad weather, and poor road condition.

In view of high and increasing number of accidents, (WHO, 2013; *Global Status Report on Road Safety*) recommended that, ways and mechanisms to stabilize and reverse the high rate of road accidents be looked at before they come disastrous. A series of studies; Nyatundo

(2014) in Kisii town and Kipngetich (2017) in Bungoma South Sub County were conducted on factors influencing commercial motorcycle accidents. The aforementioned studies only assessed the association between factors and commercial motorcycle accidents. However, the current study looked at both the association and direction of association. The direction of association was determined by use of logistic regression analysis.

It is in this context that the current study endeavored to explore factors associated with accidents involving commercial motorcycle operators in Migori town, Kenya.

1.3 Purpose of the Study

The purpose of this study was to explore factors associated with accidents involving commercial motorcycle operators in Migori town, Kenya.

1.4 Research Objectives

This study was guided by the following research objectives:

i) To determine the association between rider formal training and accidents involving commercial motorcycle operators in Migori town, Kenya

ii) To determine the effect of rider alcohol use on accidents involving commercial motorcycle operators in Migori town, Kenya

iii) To determine the association between age of rider and accidents involving commercial motorcycle operators in Migori town, Kenya

iv) To determine the association between rider compliance with traffic laws and accidents involving commercial motorcycle operators in Migori town, Kenya.

1.5 Research Questions

This study sought to answer the following research questions:

i) Is there association between rider formal training and accidents involving commercial motorcycle operators in Migori town, Kenya?

ii) Does rider alcohol use have effect on accidents involving commercial motorcycle operators in Migori town, Kenya?

iii) Is association between age of rider and accidents involving commercial motorcycle operators in Migori town, Kenya?

iv) Does rider compliance with traffic laws have association with accidents involving commercial motorcycle operators in Migori town, Kenya?

1.6 Scope of the Study

This study was limited to Migori town, Kenya. It focused on 195 commercial motorcycle operators in Migori town and 5 key Informants of the study. The study mainly looked at the factors associated with accidents involving commercial motorcycle operators in Migori town. The current study targeted all the commercial motorcycle operators registered with Migori Town motorcycle operators Sacco Limited. The study adopted descriptive survey design.

1.7 Limitations of the Study

The first limitation was that the current study targeted only commercial motorcycle operators who are registered with Migori Town motorcycle operators Sacco Limited. This could have left out a few riders who had not formally registered with the Sacco. The limitation was addressed by triangulation of information to validate the information gathered. The second limitation was that surveyed respondents were asked recall questions which tend not be easy for the respondents to provide accurate information. The limitation was addressed by asking respondents same questions, though slightly in different forms; this was done to test the consistency of responses.

The third limitation of the study was that self-reports by study respondents are associated with response bias, where a respondent response may not necessarily his/her true opinion for various reasons such as fear of victimization, for example rider alcohol use. This problem was addressed by explaining to respondents and assuring them that the purpose of the study was purely academic and not for any other purpose. In addition, respondents' confidentiality was assured and guaranteed throughout the exercise.

1.8 Basic assumptions of the Study

This study was guided by the following basic assumptions; first, that the respondents would be willing and ready to give honest and reliable information. Second, that the sample size used in the study was the right representative of the population under study. Finally, that the research instruments used would give consistent and valid results.

1.9 Justification of the Study

Results from this study may help relevant governmental departments(Ministry of transport), Non – governmental organizations, development partners, Migori County Government, policy makers, motorcycle operators, and researchers in reducing involvement in accidents among commercial motorcycle operators in Migori County. This study pointed out best practices which need to be adopted by the motorcycle operators with aim of minimizing involvement in accidents in our roads. To the development partners and Migori County Government (transport department), the study provides vital information on factors underlying accident caused by commercial motorcycle operators and possible solutions to reduce rider involvement in accidents.

Based on the findings, the study provides recommendations to the policy makers and community at large to help reduce involvement in accidents among commercial motorcycle riders. For instance, coming up with continuous rider formal training programs and ensuring high rate of training completion. The findings of this study add to the body of knowledge to scholars in transport sector especially on factors associated with accidents involving commercial motorcycle operators.

1.10 Definition of Operational Terms

Rider Accidents Involvement: Refers to unplanned and ugly event involving a motorcyclist while operating a motorcycle, leading to either destruction of properties, injuries, death or both.

Rider Alcohol Use: Refers to a tendency of commercial motorcycle operators consuming alcohol and abusing drugs during riding hours. The drugs most often abused could be among others; heroine, bhang, cocaine, etc.

A Binary Logistic Regression: Refers to a regression analysis where the dependent variable is a dummy variable consisting of only two categories. It is used only when the response variable is a dichotomous variable.

Collinearity: A situation where two or more predictor variables in a regression model have a non-zero correlation.

Cronbach Alpha: This is a measure used to assess the reliability of a test item. It measures the strength of consistency.

Rider Characteristics: Refers to general attributes, conduct or behavior of commercial motorcycle riders as they provide transport services to members of the public.

Rider Experience: The continuous cumulative period of time taken by rider to operate a commercial motorcycle.

Rider Formal Training: A structured learning process through which the motorcycle operators undergo to gather riding skills and certification showing completion.

Motorcycle: Refers to two wheeled motor vehicle whose make up differs greatly to suit different purposes.

Multicollinearity: This is a statistical phenomenon in which predictor variables in a binary logistic regression model are highly and truly associated. Less or non - existence of multicollinearity between explanatory variables is ideal when carrying out multivariate analysis.

Registered Commercial Motorcyclists: These are motorcycle operators who subscribe to a particular group legally recognized and provide transport services to the public. In this study commercial motorcycle riders who are members of a Sacco limited.

Tolerance: The proportion of unique information that a predictor variable provides in the regression analysis. This information is useful in detecting multicollinearity problem. Predictor variables with tolerance values close to indicate very little multicollinearity case.

1.11 Organization of the Study

This research work was organized in five chapters. Chapter one (introduction) includes; background of the study, problem statement, purpose of the study, research objectives , research questions, scope of the study, limitations of the study, basic assumptions of the study, justification of the study, definition of operational terms of the study, and organization of the study. Chapter two (literature review) contains; general overview of motorcycle accidents, rider formal training, rider alcohol use, age of rider, rider compliance with traffic laws, theoretical framework, conceptual framework, summary of literature review and knowledge gap. Chapter three (research methodology) carries; description of study area, research design, target population, sample size, sampling technique, data collection instruments, validity of research instruments, research assistants, pilot study, reliability of research instruments, data collection procedures, data analysis, operational of study variables, ethical issues and fieldwork challenges, and chapter summary. Chapter presents; results, interpretation and discussions of study findings, and chapter summary. Finally, chapter five contains; summary of study findings, conclusions and recommendations both for policy and further research.

CHAPTER 2 : LITERATURE REVIEW

2.0 Introduction

This chapter contains general overview of motorcycle accidents. The chapter also presents discussions from related literature on how rider formal training, rider alcohol use, age of rider and rider compliance with traffic laws are associated with accidents involving commercial motorcycle operators. Finally, the chapter also contains theoretical framework, conceptual framework, summary of literature review, and a knowledge gap.

2.1 General Overview of Motorcycling Accidents

The general acceptance of motorcycles as a mode of transport in some countries, they constitute a means of transport that is considered to be highly risky (Nunn, 2011). This is due to the fact that they do not have safety devices to the entire body or protection structure for riders and passengers (Albalate & Fernandez - Villadagos, 2010). The developing nations are at a receiving end since about seventy percent of accidents are taking place in these states. Road accidents are the leading cause of injury, with road accident injuries higher than occupational injuries. The case mentioned has attracted many scholars to conduct studies so as to explore the causes, and impacts of motorcycle transport accidents worldwide.

In Australia, there is high sales and registrations of motorcycles, but still the crashes still increased in Queensland from 2001- 2005 (Blacksman & Haworth, 2013).The traffic congestions in urban areas are to blame for rise in motorcycle accident. Blackman, Rose, Haworth & Navelle (2013) asserts in their study title ‘comparison of moped, scooter and

motorcycle crashes: implications for rider training and education; risky riding behaviors are more prevalent among young motorcycle operators, which lead to accidents. In a study, the common rider-specific crash risks include speeding and inappropriate speeds, rider impairment, unlicensed riding, rider age, riding for recreation among others (Blackman & Haworth, 2013b; Haworth, Greig, & Nielson, 2009; Lardelli - Claret et al., 2005; Lin & Kraus, 2009). The most causes of motorcycle accidents in Queensland Australia were cited as lack of rider training and licensing.

In Brazil, motorcycles stand to be the second largest fleet of vehicles; however they are responsible for the highest death rate due to traffic accidents. According to Haquea et al. (2008) motorcycles make up nearly 19 percent of all vehicles but they are responsible for 36 percent of total accidents in Singapore. Clarke et al. (2007) motorcycles account for less than 1 percent of vehicles, but drivers suffer 14 percent of total deaths and serious injuries in Great Britain roads. Traffic disorientation, failure of road and documents inspections, poor maintenance of roads, reckless cycling and the impunity of riders, all significantly lead to accidents particularly for motorcycle operators (Bastos et al., 2005; Reichcnchcim et al., 2011). Alcoholism is noted to be the major cause of accidents among motorcycle operators in Brazil among other factors.

The road traffic injury fatality rate in Thailand was 40 per 100,000 persons in 2007. The RTI are the second leading cause of burden of disease. Motorcycle – related accidents account for the majority of road accidents. The common contributing factors responsible for the accidents in Thailand includes alcohol consumption, invalid driver's license , inexperience and age of the driver, as they were found to a common characteristics in motorcycle accidents than in accidents by other vehicles (Chin & Huang , 2009) . In

Indonesia, traffic safety is an issue that is not attended to; this could be due to the fact that level of accidents in highways is still high. Suraji & Sulistio (2009) motorcycle accidents are influenced by traffic volume, speed, road status, the number of lanes, and environmental conditions. Indonesian government has safety policies, strategies, action plans and other appropriate programs to better the safety conditions of all road users.

A 2013 review by De Leon Mark Richmund et al. revealed that lack of comprehensive road safety program in Philippines is said to have increased road accidents. The government lack comprehensive safety measures just like in many other developing countries like over-speeding management, and lack of awareness on traffic safety rules by the motorcycle operators has continued to remain among the main factors that causes accidents in roads (as cited in Nyatundo, 2014).

Ogunmodede et al. (2012) identified factors influencing high rate of commercial motorcycle accidents in Nigeria. Over-speeding, wrong overtaking, poor road conditions, sudden mechanical defects and alcohol intake are the major factors behind motorcycle accidents. Non – compliance of Road Safety Highway codes by motorcycle operators was also discovered. The government of Nigeria formulated various laws which were enacted by Federal, State and local governments to curb the excesses of the riders; this includes the National Road Traffic Regulation of 2004 and FRSC Establishment Act 2007 to mention but few (Ogagaoghene, 2011). Numbers of motorbikes are estimated to have increased from 3,759 units by 2005 to 91,151 units in 2010 due to zero rating of tax on motorcycles below 250 cc in 2008 in Kenya (Daily Nation 3rd October, 2010).

In Kenya, Odera et al. (2003) points out that nearly 3,000 people are killed annually on Kenyan roads. In Migori County, motorcycle accidents are common phenomena just like in other places in developing nations. A 2003 review by National Council of Traffic Safety and Security Annual Report indicated that factors assumed to be behind these accidents are; over-speeding, poor road conditions, lack of motorcycle operators' training and experience and drunk riding. Ironically, despite the ever rising incidents of road accidents which call for further empirical attention, few studies have investigated how this situation can be averted (as cited in Nyatundo, 2014). The developing nations need to lay more effort to control and prevent road traffic accident and their outcome. Above issue can be addressed through multidisciplinary approach and research to unearth the underlying factors leading to road accidents involving different road users.

2.2 Rider Formal Training and Motorcycle Accidents

A 2004 review by Clerke and his colleagues revealed that experience and habits of riders of riders in which 14 per cent of the respondents indicated that those involved in motorcycle accidents had held licenses for one year thus confirming that inexperience is a factor that causes accidents in the United Kingdom (UK) and United States of America [U.S.A] (as cited in Kipngetich, 2017). It is thus possible that inexperienced and unskilled riding had something to do with road accident.

Ayodele (2009) noted that most accidents involving motorcycle operators are caused by unlicensed and untrained riders in Nigeria. His study further revealed that in some parts of Nigeria, *Okada* riders make their debut after a few hours of training session. An important cause for reckless riding is the lack of riding education. In fact, nearly no motorcycle

operator in Liberia has a riding license or rides a registered motorcycle (Czeh et al., 2012). A 2013 review in Tanzania, on Implementation of a Road Safety Programme for the Bago to Talawanda Road by Bishop et al. (2013) recommended educating road users and the community on associated risks and advised how the proposed changes would be adopted (as cited in Nasong'o , 2015).

Some Kenyans exploit people willing to learn riding in informal training places where an average of Ksh. 200 is used to offer one training for one hour after which a recruit is ready to start riding on the road (Githinji, 2011). According to Odera (2009) due to little training, most riders flout the traffic rules which expose them to danger while riding. Majority of the motorcycle operators undergo formal motorcycling classes while minority of the motorcycle operators does not undergo riding lessons. These few are the main causes of accidents in Kenya (Wachira, 2014). Public Service Vehicles (PSV) drivers were not adequately trained. This may be the case with riders of commercial motorcycles in Kenya (Moraa, 2010; Nyachieo, 2015). Although their syllabuses are fairly uniform, they are not standardized by the government. Furthermore, the syllabus is not mentioned in the Traffic Act Cap 403 and other regulations in the Ministry of Transport.

Nyachieo (2015) observes that the motorcycle riders involved in accidents were essentially without training. Ninety two per cent were self – taught or learned from friends or family. In addition, motorcycle rider training experience reduces accident involvement and is related to reduction of injuries in the event of accident. Odera (2009) in his study found that, lack of rider proper training was responsible to motorcycle accidents in Naivasha and its environs. A 2014 review by Sisimwo and other scholars, in their research on the causes of road traffic injuries among the victims attended to at Kitale level IV hospital revealed that, most of the

riders did not undergo formal training before riding their motorcycles (as cited by Nasong'o ,2015).

Luchidio (2015) on his study on "the impact of training on commercial motorcycle operators on their Safety in Kakamega County" revealed that, majority 51 per cent of commercial motorcycle operators had undergone motorcycle training while the rest 49 per cent had not. According to NTSA (2015) all motorcycle operators must have valid riding license and 18 years and above. Though, different countries have different regulation system regulating the transport system.

A study by Nyatundo (2014) to determine factors affecting accident rates among commercial motorcycle operators in Kisii town revealed that training has a strong influence on accident rates among the motorcycle operators in the town; this was supported by 43.8 per cent of the respondents surveyed. The current study looked at association between rider formal training and accidents involving commercial motorcycle operators in Migori town.

2.3 Rider Alcohol Use and Motorcycle Accidents

One in four automobile driver fatalities in the United States were alcohol – related during 2005 (NHTSA, 2006; Nyachieo, 2015). Center for Disease Control and Prevention (CDCP) report revealed that an increasing number of motorcycle operators aged 40 – 44 years were dying in alcohol – related crashes in the United States of America (NHTSA, 2006; Nyachieo, 2015). Odera (2013) puts it that alcohol is a risk factor for crashes involving all road users. That notwithstanding, there is limited data currently to assess extent of alcohol impairment in Africa, with the exception of South Africa.

The effects of alcohol impairment are magnified when combined with fatigue. This explains why alcohol is considered a particular risk for commercial drivers / riders who spend long hours on the road and also have legal responsibilities for the passengers or cargo they carry (WHO, 2013b; Nyachieo, 2015).

Alcohol and drugs always make people do just the opposite of what sober people would do on roads (Sashoo, 2012; Kipngetich, 2017). In Nigeria, Gabon, Rwanda, Congo, Kinshasa, Equitorial Guinea, drug abuse is high among taxi motorcycle riders as reported by Safety Net (2009). The report further noted that, motorcycle operators in these countries are more prone to crashes. A 2011 survey by Robert & Dunpoint revealed that Riding under the influence of alcohol is one of the most deadly impairment. The rate of drunken driving among the youths has surpassed any other means as indicated (as cited in Wachira, 2014).

In Kenya the sight of as many as four pillion passengers on commercial motorcycles are familiar and drunken driving rate is too high as Githinji (2011) report. A 2013 review by Luchidio, on the "impact of training commercial motorcycle operators and safety status in Kakamega County", the operators who drive under influence of alcohol also contributed to the accidents in the county by 45 per cent (as cited in Nyatundo, 2014). Drunk driving can make operators to make wrong judgments thus putting themselves and other road users in danger. In Bungoma south sub county, drunken riding among the *commercial motorcycle operators* is high as indicated by NTSA report (2017). There is a strong alcohol/ substance influence on accident rates among commercial motorcycle operators in Kisii town (Nyatundo, 2014). The current study looked at association between rider alcohol use / drug abuse and accidents involving commercial motorcycle operators in Migori town.

2.4 Age of Rider and Motorcycle Accidents

According to the findings of the Hurt report as cited by Nyachieo (2015) more than half of the accident – involved motorcycle riders in America, had less than 5 months experience on the accident motorcycle, although the total street riding experience was almost 3 years. Age is also a social determinant of health (Nyachieo, 2015). According to NTSA (2015), all motorcycle operators must have valid driving license and 18 years and above. A 2011review by Glaiza et al. indicated in their study that, young riders are usually over speed while riding which increases the risk of being involved in motorcycle accident. They further found out that, older riders, a part from being less risky are generally more experienced compared to their younger counterparts. Their study concluded that, the older riders might have encountered riding problems in the past, which probably imparted learning on the value of being cautious on the road (as cited in Wachira, 2014).

In Kenya, the most active age group is between 16 – 19 years who have just completed primary or secondary education (Maina, 2011). Hill & Chow (2002) explain that risk taking behavior is higher in young men than old men and women. Young men engage in risky activities like over speeding, overtaking using wrong sides of the road while riding and riding under influence of alcohol. Sisimwa et al. (2014) indicated that youth in reproductive age were most affected with as far as motorcycle accident is concern. Further, most riders in the study area are young.

A study by Nyachieo (2013) found that majority (72 per cent) of commercial motorcycle operators in Kitengela were young people aged between 20 – 29 years. The riders have also operated for less than three years as commercial motorcycle operators. Nyachieo (2015) on her study of socio – cultural and economic determinants of commercial motorcycle

operators transport safety in Kisumu County found that, more than half of the respondents were aged between 25 – 31 years. The study concluded that many of the operators in the *commercial motorcycle operators'* motorcycle business are mainly young adults who have operated for less than two years. According to Wilson et al., (2010) over 90 per cent of motorcycle operators involved in an accident do not have proper formal training instead rely on family , friend or being self – taught. As a result motorcycle riders between ages of 16 – 24 years are significantly overrepresented in accident; motorcycle riders between the ages of 30 and 50 are significantly underrepresented.

In a study by Kipngetich (2017) to explore factors influencing commercial motorcycle operators accidents in Bungoma south sub county found that, majority (65 per cent) of the respondents strongly agreed that there was general lack of driving/ riding experience in the sub county resulting to motorcycle accidents. The current study looked at association between rider experience and accidents involving commercial motorcycle operators in Migori town.

2.5 Rider Compliance with Traffic Laws and Motorcycle Accidents

Developing economies have high levels of road accidents which are accounted for by many factors like road designs and most importantly the driver / rider behavior. In Saudi Arabia over 50 percent of road accidents are caused by over speeding of the drivers / riders. Other causes include not obeying road traffic signs and using incorrect methods of overtaking, u – turning and parking; an insignificant number was caused by alcohol and use of mobile phones while riding (Ansari, Akdaar, Mandoorah & Moutaery, 2010).

The emergence of public motorcycle taxi business in most countries in Sub – Saharan Africa was to a larger extent facilitated by lack of proper laws and regulations. This has been shown by various studies. Olvera Diaz, Plat & Maidadi (2012) as cited by Nasong'o (2015) showed that the government of Cameroon issued a decree setting out rules and regulations governing public motorcycle operations in 1995. Most operators as late as 2012 had not complied with basic requirements in riding like; getting a license, wearing helmets while riding by operators and the passengers or the painting of motorbikes with yellow colour.

In Kampala, Uganda, the 2011 annual traffic report showed that a total of 1,762 serious accidents involving motorbikes occurred in the capital city (Nakiyimba, 2012). Riders do not wear protective clothing and also ignore traffic rules while others are ignorant of the traffic rules and regulations.

Kimwetich et al. (2012) in their study to determine the level of compliance and awareness of traffic rules and regulations among operators in Kitui town, only 2.2 per cent of the 90 motorcycle taxi operators knew traffic rules that governed their operators. Chalya et al. (2012) noted that road traffic crashes constituted a major public health problem and significantly contributed to unacceptably high morbidity and mortality in Tanzania. This was attributed to; poor knowledge and practice of road safety measures by the general population, recklessness by motorcycle operators and driving at high speed.

A study carried out in Naivasha hospital by the Road Safety in 10 counties project revealed that 36 per cent of patients who were taken to the emergency department because of road traffic crashes were motorcycle operators. About 75 per cent of these patients were not wearing a helmet at the time of the crash. Helmet wearing among motorcycle passengers is

as low as 3 per cent (WHO, 2013a). Motorcycle – related road crashes in Kenya are a major health concern and will continue to grow if there are no appropriate interventions measures put in place. The current study looked at association between rider compliance with traffic laws and accidents involving commercial motorcycle operators in Migori town.

2.6 Theoretical Framework

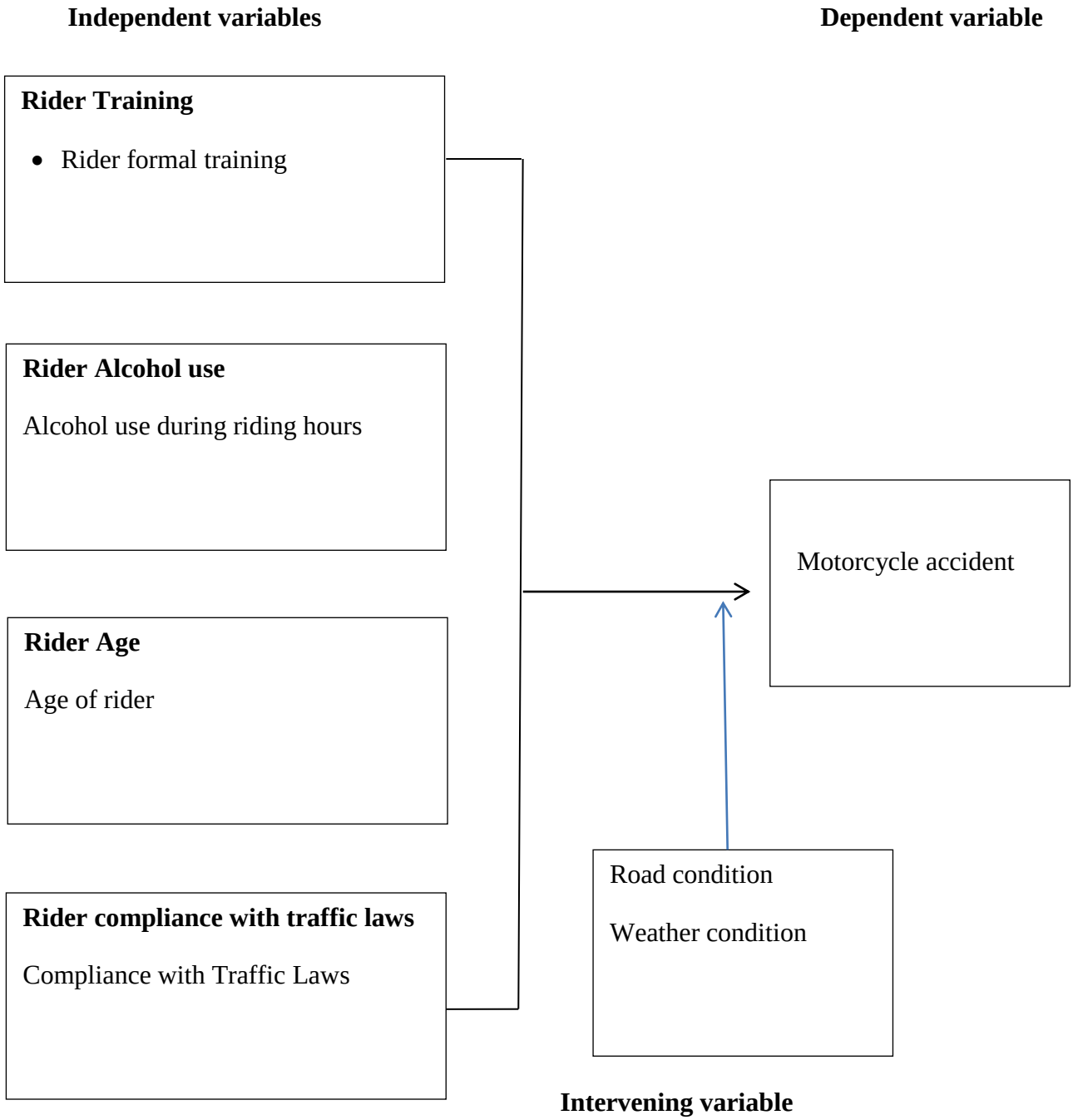
To understand the factors associated with accidents involving commercial motorcycle operators, the study was informed by Human Factor Theory. The theory states that human errors cause accident. Human factors theory structure is a cause/ effect format. The theory of causation links accident to a chain of phenomenon caused by human error.

Factors such as worker overload, inappropriate worker responses, and worker inappropriate activities cause human error. In case of overload, the worker (commercial motorcycle operators) is deemed to be beyond the capability with reference to either physical or psychological factors making the worker to get involved in an accident. For inappropriate worker response, there are hazards and worker's errors which results to accidents. On inappropriate activities there is lack of training and misjudgment of dangers as the causal effects of accidents involving the worker (commercial motorcycle operators).

Lack of proper formal training, alcohol use, drug abuse, inexperience, lack of knowledge on traffic laws and disobedient to traffic laws influence human errors leading to accidents. The ideas in the Human Factors Theory are considered relevant to the current study.

2.7 Conceptual Framework

The conceptual framework below illustrates how the independent variables relate with the dependent variable with the presence of intervening variable.



Source: Researcher Conceptualization, 2017

Figure 2.1: Conceptual Framework showing association between Independent variables and dependent variable.

The arrow used in Fig. 2.1, indicate the direction of influence. As deduced from the reviewed literature; poor or lack of formal training denies motorcycle operators chance to get necessary competence to operate motorcycles thus leading to motorcycle accidents. Use of alcohol use by motorcycle operators results to impaired judgments and reduces patience hence leading to motorcycle accident. Riders young are associated with high speed while riding hence increases the chances of motorcycle operators being involved in accidents; above all, non- compliance with traffic laws to a greater extent lead motorcycle road accidents.

Other factors; such as traffic congestion, bad weather, poor road status, over speeding while riding, poor mechanical maintenance among others may also influence accidents involving motorcycle operators. But the current study looked at only the association between; formal training, alcohol use, age of rider and compliance with traffic laws.

The conceptual framework therefore, indicates interplay between formal training, alcohol use, age of rider and compliance with traffic laws and motorcycle accident, especially in a situation where there is poor road condition and unfavorable weather condition for safe riding.

2.8 Summary of Literature Review

In the forgoing chapter a review of relevant literature, the theoretical framework and the conceptual basis for this study has been presented. The review covered global, regional and local status of commercial motorcycle accidents. It has reviewed various ways in which formal training, alcohol use, age of rider and compliance with traffic laws associates with accidents involving commercial motorcycle operators.

2.9 Knowledge Gap

Factors influencing the rate of motorcycle accidents are well documented in the reviewed literature but little literature can be found about factors associated with accidents involving commercial motorcycle operators in Migori town. This study explored how formal training, alcohol use, age of rider and compliance with traffic laws associate with motorcycle accidents. This kind of study has never been conducted in Migori town despite the increase number of accidents in the region (NTSA report January, 2017).

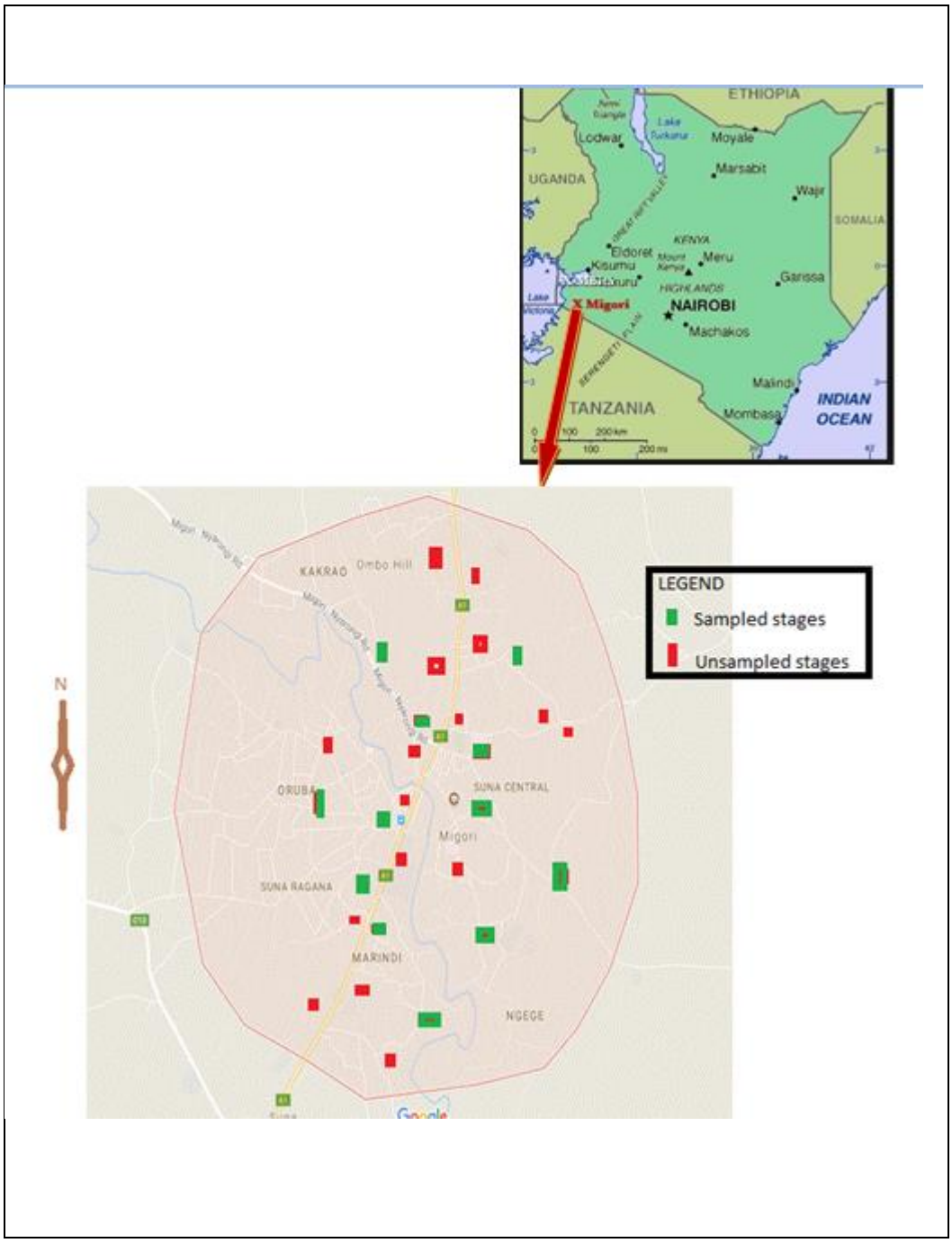
CHAPTER 3 : RESEARCH METHODOLOGY

3.0 Introduction

This chapter focuses on research methodology under the following sub headings: Study area, research design, target population, sample size and sampling technique. Equally, the chapter contains data collection instruments, validity of instruments, research assistants, pilot study, reliability of instruments, operationalization of study variables, data collection procedures, data analysis, and ethical issues and fieldwork challenges.

3.1 Study Area

Migori County is located about 63 km south off Kisii town and 22 km north off the Tanzanian border as indicated by Agricultural Sector Development Support Programme (ASDSP) (ASDSP, 2014). Migori town is located at latitude 1°03'48'' 21'''South and longitude 34°28'23''16'''East. The town falls in two sub counties of Migori County; Suna East and Suna West with River Migori as the boundary. According to the national census program that was done in 2009, the population of Migori town was estimated to be 53,100 persons; this was projected to rise to 65,515 persons in 2015 and 70,272 persons in 2017 (see location of the Study area in Figure 3.1).



Source: Google Maps, 2017

Figure 3.1: Map of Migori Town Showing Study Sites

This study was undertaken among sampled commercial motorcycle operators' registered with Migori Town Motorists Sacco Limited in their various stages within Migori town. The town hosts Migori County Referral Hospital. The town was purposively selected for study because the town is the County headquarters which has the highest population amongst other urban centers in Migori County. It was therefore expected that it would have many commercial motorcycle operators since it is an economic hub of the County, because the town links Kenya with north of Tanzania. In addition, the Migori is a cosmopolitan town inhabited by many racial/ethnic communities such as the Luo, Abakuria, Abaluhyia, Abagusii, Somalis, Indians, Arabs, and Nubians among others.

The investigator is a resident of Migori Town hence more conversant with the town and the commercial motor cycle taxi business in the town. In fact, a casual preliminary visit to the Migori County Referral Hospital by the investigator revealed that the hospital has special wards for motorcycle accident victims, a possible indication that there were problems relating to commercial motorcycle accidents in the study area. This was another reason for purposively selecting the study area.

3.2 Research Design

The study employed a descriptive survey design. The design was used because it allows collection of large amount of data which allow detailed analysis. The descriptive survey design helped the study to generate information on accidents involving commercial motorcycle operators in Migori town.

3.3 Target Population

The target population was the commercial motorcycle operators operating in Migori town who are registered with Migori town motorist Sacco limited. There were a total of three hundred and eighty (380) commercial motorcycle operators in Migori town registered with the Motorcycle operators Sacco. Five (5) key informants; Traffic Police officer, Licensing Officer, Migori Town Administrator, Medical officer Migori County Referral Hospital, and Migori town Motorcycle operators Sacco official were also included in the study.

3.4 Sample Size and Sampling Technique

3.4.1 Sample Size

Sample size can be determined using different approaches such as census for a small population, imitating a sample size of similar studies, using published tables, and applying formulas.

The sample size of this study was determined by use of Yamane (1967) formula. The formula has two main components; the population and level of precision. The named two components of the formula were used by the investigator to determine the sample size required. The formula stated as follows;

Sample size

$$n = N \div [1 + N (e)^2]$$

Where:

n = the sample size required,

N = the population size and e is the level of precision.

To determine sample size, the study used confidence level of 95per cent (level of precision of 5per cent) and a population of 380 commercial motorcycle operators in Migori town.

Therefore, $n = 380 \div [1 + 380(0.05)^2] = 194.87$. The sample size calculated was 195.

3.4.2 Sampling Technique

Migori town was purposively selected. The town is within Migori County. Study sample was selected from 380 commercial motorcycle operators registered with Migori Town Motorcycle operators Sacco Limited.

To get the study sample, the investigator obtained a list (sample frame) of all the 380 commercial motorcycle riders consisting of their details such as stage of registration and cellphone numbers. Using information in the sample frame, 380 riders were assigned unique identities.

The unique identities were entered into computer (Microsoft office excel) to generate a total of 380 random numbers. Random numbers were generated by computer, because the computer is fast, accurate and efficient. Finally all the 380 random numbers were subjected to simple random sampling to get the required sample of 195. Simple random sampling was used because it provides all the units of a population with equal chance to be included in the study hence reduce biasness.

The field support team helped the investigator to locate the sampled riders in their stages where the survey took place.

In addition, a purposive sampling was used to identify five (5) key informants of the study. The key informants of the were; Migori Traffic Police Officer, Business Licensing Officer, Migori Town Administrator, Medical Officer Migori County Referral Hospital, and Migori town Motorcycle operators Sacco Limited official.

3.5 Data Collection Instruments

The study employed mixed method approach in data collection. Both quantitative and qualitative approaches were used. Quantitative approach was employed to collect information from sampled commercial motorcycle operators using structured questionnaire while qualitative approach was used to gather information from key informants using In – depth interviews.

3.5.1 Questionnaire

Structured questionnaire was used to determine the link between rider attributes and accidents involving commercial motorcycle operators. Questionnaire is suitable for data collection since the instrument ensures high response rate at a low cost (Mugenda & Mugenda, 1999). Further, questionnaire was appealing for this study since it is anonymous and can help to generate candid answers.

The questionnaire was mainly divided into two sections; Respondents Background and Study Variables. The respondents background comprised; gender, age, level of education, riding duration, and accident involvement. On the other hand, study variables comprised the four (4) dimensions; rider formal training, rider alcohol use, age of rider, and rider compliance with traffic laws.

A structured questionnaire was used to gather information from respondents. Copies of questionnaire were administered with close ended questions for easy statistical analysis (Jackson, 2009). Open–ended questions, which allow respondents to answer questions in their own words, were avoided in the questionnaire design; this was necessitated by the reality that people differ in their ability and willingness to write answers and that open-ended questions can be difficult to interpret statistically. Further, a structured questionnaire is generally easier to analyze statistically and simplifies turning the data analysis into quantitative results that can be used for making decision.

To test reliability of the questionnaire, Cronbach's coefficient alphas were computed; the obtained alpha values ranged from 0.78 to 0.84. The alpha values are acceptable as they exceeded the 0.7 threshold as recommended by Gliem & Gliem (2003).

3.5.2 Interview Guide

The interview guides comprised of six questions for key informant of the study. An interview makes it possible to get information needed to achieve specific objectives under study (Mugenda & Mugenda, 1999). It was also used, since it gives the researcher opportunity for probing the interviewees, consequently taking care of the weaknesses of questionnaire. The interview guide was used by the researcher to carry out in – depth interviews to individual key informant of the study.

3.6 Validity of Research Instruments

To ensure that the instrument measure what is supposed to measure and perform as it is designed to, validity test was done as follows: first, content validity test was conducted by verification of the instruments through expert opinions from supervisors. Secondly, face validity test was done by subjecting the instruments to expert analysis and opinions to check the representativeness of the research instruments. Construct validity test was done by restricting the questions to the conceptualization of the variables. The purpose of the check was to ensure that each question in the instruments adequately assess the construct it is meant to assess.

3.7 Research Assistants

The research assistants were recruited in a competitive manner and had to meet the following requirements; be a holder of diploma in any social sciences course, and have experience of at least two years after graduation and proficiency in use of both English and Kiswahili languages. A total of six (6) research assistants were identified (four males and two females).

A training workshop for data collection and ethical issues in research was held with the identified research assistants for a period of two days. Training of the research assistants helped to ensure quality data was collected. After the training an evaluation was carried out to select research assistants who were involved in data collection, three (3) research assistants (two males and one female) were finally selected to assist in data collection.

3.8 Pilot Study

The developed research instruments were pre tested before embarking in on the actual data collection. The pretest was done to ensure validity and reliability of the developed tools. As a general rule, 5 – 15 respondents are adequate for a pretest (Nyachieo, 2015). The tools were pretested on 15 people (commercial motorcycle operators) with similar conditions to those of the actual study area.

After the pretest, the questions that appeared similar (repeated) on the instruments were removed hence reducing the number of questions in the instruments, also some questions were revised to ensure clarity of instructions to respondents.

The pretest enabled the standardization of the instruments; this allowed research assistants to familiarize with the instruments. Further, debriefing sessions were held between the investigator and the three research assistants to discuss the challenges in the instruments during pretest. However, the findings of the pretest were not included in the final report.

3.9 Reliability of Research Instrument

To achieve internal consistency reliability, some questions in the questionnaire were paraphrased but the response codes were maintained. Further, test and retest reliability was ensured by pre-testing the questionnaire and training of the two research assistants.

3.10 Data Collection Procedures

Data was collected using structured questionnaire from sampled commercial riders and in – depth interview schedule from key informants.

3.10.1 Administering Questionnaire

Pretested structured questionnaire was used to collect quantitative data from sampled commercial motorcycle riders to identify factors associated with accidents involving commercial motorcycle operators, in Migori town. The questionnaire was used since it ensures high response rate at a low cost. The research assistants supplied copies of the pretested questionnaire to the sampled commercial motorcycle operators (respondents) in their various stages to respond to the questions.

The respondents were surveyed during off peak hours (between 11am and 3pm); this was done to reduce interference during questionnaire filling, because riders are people who are busy ferrying passengers during peak hours. However, to a commercial motorcycle rider who was not conversant with the English language used in the questionnaire, the research assistant who underwent practicum training to equip them with the basic knowledge, attitudes and skills of data collection; verbally translated the questions to either Kiswahili or any other language depending on preference of the survey respondent.

The researcher closely supervised the research assistants while administering the questionnaires to the surveyed respondents; this facilitated the collection of quality quantitative data.

3.10.2 Interviewing Key Informants

The qualitative data were collected using in – depth interviews (IDIs) from key informants of the study including; Migori Traffic Police Base, Business Licensing Officer, Migori Town Administrator, Senior Medical Migori County Referral Hospital, and Migori town Motorcycle operators Sacco Limited official. In this technique, respondents are allowed to give their subjective interpretations of subjects and the interviews are normally conducted based on a prepared guideline. Since, IDIs can be carried out in private places, more detailed information may be gathered with regard to experience, opinion and attitude of the respondents.

The reason for including key informants in the study was to gather in - depth information from people who are not commercial motorcycle riders but are knowledgeable about the business.

3.11 Data Analysis

The study employed mixed method approach to generate both qualitative and quantitative data. The qualitative data was collected from key informants' interviews while quantitative data was generated from structured questionnaire.

Content analysis approach was used in analyzing qualitative data. The investigator read through the interview scripts to establish sets of categories and summarized main themes. The qualitative data was used to reinforce the quantitative data, where some of the reported statements by key informants of the study were quoted verbatim.

Quantitative data was analyzed descriptively after it was classified, cleaned, coded, sorted and entered into Statistical Package for Social Sciences (SPSS) version 20. The SPSS tool

was necessary since it helped to summarize large amounts of data to make them manageable during analysis stage.

The quantitative data was analyzed using descriptive and inferential statistics. Univariate, bivariate and multivariate analytical techniques were employed. Univariate technique was used to analyze individual study variables using SPSS and Microsoft Office Excell 2010. Bivariate analyses used chi – square and Fisher's exact tests accordingly to test the significance between individual predictor variable and the dependent variable (motorcycle accident involvement). A probability value of $p \leq 0.05$ was considered statistically significant. For the case of multivariate analysis, a binary logistic regression model was run in SPSS to determine the net effect predictor variables on dependent variable. That is, to examine which among (factors) accident predictors was statistically significant. Logistic regression model was used in this study because motorcycle accident involvement was the dependent variable which was a binary measure with only two possible outcomes; 1 for ever been involved in accident and 2 for never been involved in accident.

Predictor variables which were found to be statistically significant in bivariate analyses were included in the logistic regression model first. In addition, the predictor variables which were not found to be statistically significant in this study but were significant in other studies as revealed in the reviewed literature were also included in the model.

The predictor variable; rider training was included in the model together with dependent variable (motorcycle accident involvement) first since it was statistically significant in the bivariate analyses. Other predictor variables like alcohol use, age of rider, and compliance

with traffic laws were later included in the regression model because they were not significant in this study but significant in other studies.

The maximum likelihood was used to estimate the logistic regression models with the likelihood function expressing the probability of obtaining the observed sample as a function of model parameters. The respective odds ratios (OR) and p – values were obtained and reported as a measure of influence and strength. The model is summarized as:

Logit P (accident involving commercial motorcycle operators) = $\alpha + \beta_1$ rider training + β_2 age of rider + β_3 rider alcohol use + β_4 rider compliance with traffic laws.

Where:

α = constant of the equation

β = the coefficient of the predictor variables.

3.12 Ethical Issues and Fieldwork Challenges

The protocol of this study was authorized by the School of Graduate Studies, through an introduction letter to the National Commission for Science, Technology and Innovation (NACOSTI). The researcher was then issued with a research permit from NACOSTI to carry out this study. Further, research approvals to conduct this study in Migori town were also given from the offices of County Commissioner (CC) and County Director of Education (CDE), Migori County.

Letters of intent were supplied to all the sampled commercial motorcycle operators' stages through their chairpersons. In the letter of intent, reasons for conducting the study were well explained. In addition, all the study subjects were assured of anonymity protection and

confidentiality of information they provided. Sometimes, the consent process was indeed long, as the officials in charge of some sampled stages were not available on visit or attending meetings.

The research assistants gave consent forms to all the 195 sampled commercial motorcycle operators, which sought for their consent to participate in this study. Moreover, the consent form adequately informed the respondents of their rights to voluntarily participate in this study.

It was challenging and frustrating process to locate and recruit the main respondents of the study, since some of the commercial motorcycle operators were not usual operators of the town or only visited town on rare occasion. In spite of this challenge, core participants of the study were identified from Migori town Motorist Sacco register who only registered usual town commercial motorcycle operators.

Another challenge that the investigator encountered during fieldwork was, surveying the respondents (commercial motorcycle riders) who were mostly busy required to ferry their passengers. To address this challenge and ensure quality data was collected from the sampled riders, copies of questionnaire were mainly supplied to the respondents during off peak hours (11am to 3pm) when commercial motorcycle operators were less busy.

3.13 Operationalization of Study Variables

The current study considered two variables; the independent variables and dependent variable. The independent variables (factors) considered were: rider formal training, rider alcohol use, age of rider and rider compliance with traffic laws. The dependent variable considered was motorcycle accident. Table 3.1 operationalizes the variables in the study.

Table 3.1: Definition of variables in the Study

Research Objectives	**Variables (V)**	**Indicators**	**Descriptive Analysis**
To determine the association between rider formal training and accidents involving commercial motorcycle operators in Migori town, Kenya.	*Independent V* -Rider formal training *Dependent V* -Motorcycle Accidents	-Formal training	- Frequencies - Percentages
To determine effect of rider alcohol use on accidents involving commercial motorcycle operators in Migori town, Kenya.	*Independent V* -Alcohol use *Dependent V* -Motorcycle Accidents	-Alcohol use	- Frequencies - Percentages
To determine the association between age of rider and accidents involving commercial motorcycle operators in Migori town, Kenya.	*Independent V* -Age of rider *Dependent V* -Motorcycle Accidents	-Age of rider	- Frequencies - Percentages
To determine the association between rider compliance with traffic laws and accidents involving commercial motorcycle operators in Migori town, Kenya.	*Independent V* -Compliance with traffic laws *Dependent V* -Motorcycle Accidents	-Compliance with traffic laws	- Frequencies - Percentages

Source: Researcher own conceptualization, 2017

3.14 Chapter Summary

This chapter presented the research methods and design that were used in this study. The design used was a descriptive survey with mixed methods approach. A study area was described and target population given. A simple random sampling technique was used to identify 195 respondents for the study. Research instruments used for data collection were; questionnaire and interview guide. Both qualitative and quantitative data was collected. Qualitative data was gathered from key informants using interview guide. On the other hand, quantitative data was collected from commercial motorcycle operators using structured questionnaire. Analysis for qualitative data and quantitative data was done separately. Content analysis approach was used to analyze qualitative data to identify main themes. Quantitative data was analyzed using SPSS version 20 and Microsoft Office Excell 2010. Inferential statistics were used to assess association between individual independent variables (factors) and dependent variable (motorcycle accident). A binary logistic regression was run to determine significant predictor variables on motorcycle accident involvement. Chapter four presents data analysis, presentation and discussions.

CHAPTER 4: FINDINGS , INTERPRETATION AND DISCUSSIONS

4.0 Introduction

In this chapter, the results of the data analysis are presented, interpreted and discussed. The analysis, presentations and interpretations was done as per the research objectives. The purpose of the study was to explore factors associated with accidents involving commercial motorcycle operators in Migori town.

This chapter presents questionnaire response return rate, the respondents' characteristics are also presented. This is followed by an analysis of each specific objective; this was done by stating results found, presenting results, and interpretations of the results, conclusion and discussion on that specific objective. Further, the chapter contains a collinarity diagnosis and multicollinearity among predictor variables in a regression model, and a multivariate analysis using a binary logistic regression model.

4.1 Questionnaire Response Return Rate

A randomly sampled one hundred and ninety five (195) commercial motorcycle operators were surveyed using pretested structured questionnaires. Out of 195 sampled operators, 18 operators declined to take part in the study for reasons known to them. Further, other 12 administered questionnaires were not included in the analysis because they were incomplete. Thus, a total of 165 completed questionnaires were left for analysis, giving a response rate of 84.6 per cent. The response return rate of 84.6 per cent was considered adequate for this study, since Cooper & Schindler (2000) argues that; a response return rate more than 75 per cent of the targeted respondents is enough for a study. Further, the fact that data was

gathered from subjects who were randomly sampled made the study to have unbiased findings.

4.2 Univariate Analysis

This section described and summarized selected important characteristics of study respondents using descriptive statistics.

4.2.1 Background Characteristics of Respondents

In this study, structured questionnaire was administered to the sampled commercial motorcycle operators who were riding in Migori town when the study was undertaken. Information about their age, level of education, riding duration and accident involvement was considered important for this study, and was asked in the pretested structured questionnaire. Table 4.1 summarizes the selected background characteristics of surveyed respondents.

Table 4.1: Percentage Distribution of the Surveyed Respondents by Selected Background Characteristics

Background characteristics	Frequency (n)	Percentage (%)
Age of rider (years)		
18 to 30	63	38.2
31 to 42	53	32.1
43 to 54	35	21.2
Over 54	14	8.5
Level of education		
No education	65	39.4
Primary	55	33.3
Secondary	31	18.8
Tertiary	14	8.5
Riding duration (years)		
Less than 1	36	21.8
1 to 3	64	38.8
4 to 6	42	25.5
Over 6	23	13.9
Accident Involvement		
Ever been involved	45	27.3
Never been involved	120	72.7
Total	**165**	**100.0**

Source: Survey Data, 2017

Table 4.1 above reveals that, sixty three (38 per cent) of the respondents were in the age bracket 18 to 30 years when the study was undertaken. The respondents in the age group 31 to 42 years were fifty three (32 per cent). Thirty five (21 per cent) of the surveyed respondents were aged between 43 to 54 years. Minority, fourteen (9 per cent) of the respondents were riders who were aged over 54 years. This is an indication that most of the commercial motorcycle operators in Migori town are averagely young riders. This finding was expected because most of young people in Kenya are unemployed. These findings concur with other studies for example; a study by Nyachieo (2012) in Kitengela revealed that majority (72per cent) of commercial motorcycle operators were young people age between 20 – 29 years. A study in Kisumu conducted by Nyachieo (2015) also confirmed the findings of the current study. Her study finding indicated that 51.9per cent of the respondents were aged between 25 – 31 years. Sisimwa et al. (2014) reported that, most riders engaged in commercial motorcycle taxi business are young operators in Kitale town.

Majority, sixty five (39 per cent) of respondents had no education qualification. Fifty five (33 per cent) of the respondents had primary education as their highest academic qualification. Thirty one (19 per cent) of the respondents indicated they had secondary education qualification. The respondents who reported they had attained academic qualification above secondary were fourteen (9 per cent). From these findings, it is evident that most of those who engage in commercial motorcycle business in the town have no or primary education, indication that the business attracts majority of riders with low education level. The result of the current study contradicts findings of other studies. For example, Kumar (2011) noted that commercial motorcycle riders were reasonably educated. A study by Mahlstein (2009) indicated that the *'okada'* riders were not illiterate as only as only ten

surveyed respondents had not attended formal school. Similarly a study in Kisumu by Nyachieo (2015) revealed that more than half of the respondents had at least secondary education.

Thirty six (29 per cent) of the respondents had worked as motorcycle operators for a period less than one year. The majority, sixty four (39 per cent) of the respondents had worked as commercial riders for a period between 1 to 3 years. Fourteen (26 per cent) of the respondents had operated commercial motorcycle for a period between 4 to 6 years. In addition, twenty three (14 per cent) of respondents had operated motorcycle for more than 6 years. This finding implies that majority of commercial motorcycle operators in the town are less experienced with regard to riding of motorcycle. Almost similar findings to the current study were revealed by Mahlstein (2009) in Calabar, Nigeria. The study found that, 62.3 per cent of the respondents had operated commercial motorcycle taxi for five years and below. Those who had operated for between six and ten years accounted for 24.6 per cent. The remaining 12.3 per cent had been in the business for more than ten years (Mahlstein, 2009).

A total of forty five (27 per cent) of the surveyed commercial motorcycle operators had been involved in accident while riding motorcycle. One hundred and twenty (73 per cent) of all the respondents indicated they had never been involved in an accident. The finding indicates that more than a quarter of the commercial motorcycle operators surveyed had been involved in accident while riding in Migori town.

4.3 Bivariate Analysis

In this sub section, cross tabulations of dependent variable (motorcycle accident), by selected individual predictor variable are presented; to test if there is any association between the two variables. Statistical association is tested using either Pearson chi – square or Fisher's exact test accordingly. Probability values $p \leq 0.05$ indicate statistical association between the variables.

4.3.1 Rider Formal Training and Motorcycle Accident

To measure rider formal training, surveyed respondents were asked to indicate where they acquired riding skills before they got to road to operate commercial motorcycle taxi business. A cross tabulation was performed using Pearson chi – square or Fisher's exact test to test if there is association between rider formal training and motorcycle accidents.

The findings as shown in Table 4.2 ,reveals that, among the surveyed respondents, only two (5 per cent) commercial motorcycle operators who have ever been involved in accident reported that they acquired riding skills in a formal set up (driving school) compared with thirty five (95 per cent) of the surveyed respondents who had never been involved in an accident. Forty three (34 per cent) of the surveyed respondents who had been involved in accident indicated that they do not possess riding license compared with eighty five (66 per cent) of those surveyed respondents who had never been involved in an accident while operating motorcycle.

These statistics basically indicate that commercial motorcycle riders who acquired riding skills in a driving / riding school were more likely not to be involved in accident compared to their counterparts who learnt how to operate motorbikes in an informal set up (backstreet

training). The Chi – Square results indicate that there is significant difference between those riders who were formally trained and those who were informally trained with regard to motorcycle accident involvement ($X^2 = 11.498; df = 1; p = .001; N = 165$). Table 4.2 summarizes the association between rider training and accident involving commercial motorcycle operators in Migori town.

Table 4.2: Percentage Distribution of Rider Training against Motorcycle Accident Involvement

Rider Training	Motorcycle Accident Involvement			
	Ever been involved		Never been involved	
	Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)
Formal training	2	5.4	35	94.6
Informal training	43	33.6	85	66.4
Note : *Pearson Chi - square* (X^2) *= 11.498; df = 1; p = .001; N = 165; No missing case*				

Source: Survey Data, 2017

In this study, those riders who were not formally trained and lacked riding license are more likely to be involved in motorcycle accident while operating in the town. A study in Nigeria, Ayodele (2009) indicates that most accidents involving commercial motorcycle operators are caused by unlicensed and untrained riders. The study revealed that an important cause for reckless riding is the lack of riding education. The results for the Nigeria study agree with the results of the current study. A 2013 review by Bishop and others on Implementation of a Road Safety Programme for the Bago to Talawanda Road in Tanzania,

recommended educating road users particularly motorcycle riders and their community on associated risks and advised how the changes should be adopted (as cited in Wachira,2014).

The findings of Luchidio (2015) on the study of "the impact of training on commercial motorcycle operators on their safety in Kakamega County", is not in support with the findings of the current study. He found that majority (51 per cent) of commercial motorcycle operators had undergone motorcycle training while the rest of the surveyed riders (49 per cent) had not formally trained to operate motorcycle. A study by Nyatundo (2014) while looking at factors affecting accident rates among commercial motorcycle operators observed that in Kisii town, riders were mostly unlicensed. The study linked possession of license with training, and made a conclusion that, unlicensed riders were the main cause of accidents involving commercial motorcycle operators. The findings of Kisii study was in support with the findings of the current study that, revealed that lack of rider license was responsible for high accident cases involving commercial motorcycle operators.

Findings from related studies clearly indicate that formal training has a connection with accident involving commercial motorcycle operators. According to Odera (2009) due to little training, most riders flout traffic laws exposing the riders to most dangers phenomenon while riding. A 2010 survey by Moraa indicted that public service vehicles drivers were not adequately trained. This may be the case with commercial motorcycle riders in Kenya (as cited in Nyachieo, 2015).

A study by Nyachieo (2013) disagreed with the finding of the current study. His study revealed that, majority of the motorcycle operators undergoes formal motorcycle operators' classes while minority of them does not undergo riding training. Though, the conclusion

that, the few untrained are the main cause of accidents concurred with findings of the current study. It is generally assumed therefore that, those drivers who have gone through formal education and training programs should be less involved in accidents compared to their counterparts who have not received such training. The findings of this study are consistent with these assumptions much as they are inconsistent with a number of studies that have failed to show any positive effect of such programs on safety and non-involvement in accidents. However, the findings of a study by Nyachieo (2015) contradict the findings of the current study. Her study on socio – cultural and economic determinants of commercial motorcycle operators motorcycle transport safety in Kisumu County, she found no significant difference between those formally trained riders involved in commercial motorcycle operators accidents and those untrained riders involved in commercial motorcycle operators accidents. The study further reported that, even those who were licensed had acquired their licenses without even taking the riding test. The riders could have corrupt means to be licensed (Nyachieo, 2015).

The association witnessed between rider formal training and accident involvement among commercial motorcycle operators was also confirmed by majority of key informants during in-depth interviews (IDIs) carried out by the researcher to all the five key informant of the study in their respective offices in the town. One interviewee, during IDIs, however, held a different opinion. The interviewee argued that, formal rider training does not necessarily translate to lower involvement in accidents. The interviewee stated that, in spite of the fact that many commercial motorcycle operators have no formal training; most of them have never been involved in an accident. The interviewee also noted that there are a few riders

who have had formal rider training and are licensed to ride and yet have been involved in accidents.

The interviewee stated as follows with reference to rider formal training and involvement in accidents:

*"What is important in my view is knowledge of traffic rules and regulations, which someone can learn even without getting formal training… one, can learn how to ride competently by training in an informal environment" (*KI – Motorcycle operators Sacco Official, Migori town).

4.3.2 Rider Alcohol Use and Motorcycle Accidents

It was vital to probe commercial motorcycle operators on their behavior concerning alcohol consumption since this bears a potential bearing on road safety level. To measure rider alcohol use, sampled commercial motorcycle riders were requested in the structured questionnaire to indicate whether or not they do use alcohol during riding hours. A cross tabulation was performed using Pearson chi square or Fisher's exact test to test if there is significant difference between rider alcohol use and motorcycle accident involvement .

Table 4.3 indicates that, thirty one (27 per cent) of the surveyed commercial motorcycle riders who had been involved in an accident indicated that they consume alcohol during riding period compared with eighty three (73 per cent) of the commercial motorcycle riders who had not been involved in an accident. Fourteen (27 per cent) of the commercial motorcycle operators who had been involved in an accident reported they don't consume alcohol. Similarly, thirty seven (73 per cent) of commercial motorcycle riders who have never been involved in motorcycle accident, indicate they do not consume alcohol while

riding motorbikes in the town. The Chi – Square results indicate that there is no significant difference between those commercial motorcycle riders who consume alcohol and those riders who do not consume alcohol with regard to motorcycle accident involvement (χ^2 = 0.001; df = 1; p = .973; N = 165). Table 4.3 summarizes the association between rider alcohol use and accident involving commercial motorcycle operators in Migori town.

Table 4.3: Percentage Distribution of Rider Alcohol Use by Motorcycle Accident Involvement

Rider Alcohol use	Motorcycle Accident Involvement			
	Ever been involved		Never been involved	
	Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)
Drink	31	27.2	83	72.8
Don't drink	14	27.4	37	72.5
Note : *Pearson Chi - square (χ^2) = 0.001; df = 1; p = .973; N = 165; No missing case*				

Source: Survey Data, 2017

It is worthwhile reporting that, despite none statistical association witnessed from bivariate analysis between rider alcohol use and accident involving commercial motorcycle operators, there was consensus among the five key informants of the study engaged by the researcher during IDIs, that riding under the influence of alcohol / drugs influences accident involving the motorcycle operators. One of the interviewees noted that most of the commercial motorcycle riders in Migori town consume alcohol and go ahead to ride while they are still intoxicated. The following statement from an interviewee emphasized the use of alcohol among commercial motorcycle operators in Migori town. *"Riding under the influence of*

alcohol use/drug abuse is particularly a common phenomenon among commercial motorcycle riders in Migori town" (KI – Traffic Police Officer, Migori town).

According to another interviewee, the high number of accidents that are reported during and as the weekend approaches is partly attributed to alcohol use by commercial motorcycle riders. These sentiments were further confirmed by another interviewee who stated: *"At the hospital, we realize that many commercial motorcycle operators' patients who are involved in an accident especially during weekends or on Monday morning's show signs of having consumed alcohol or drug" (*KI – Senior Medical Officer, Migori County Referral Hospital).

The results from the bivariate analysis on rider alcohol use and accident involving commercial motorcycle operators are inconsistent with those of several studies that have shown a strong link between drink driving and involvement in accidents. In some African countries like Nigeria, Rwanda, Congo and Kinshasa; drug abuse is high among taxi motorcycle operators as reported by Safety Net (2009). The report further noted that, motorcycle operators in these countries are more prone to road crashes. A study conducted by Odera (2013) for example, linked drink-driving and consumption of hard drugs to serious crashes involving motorcycle riders. He puts it that alcohol is a risk factor for crashes involving all road users.

Another study by WHO (2013b) indicated that, the effects of alcohol impairment are magnified when combined with fatigue. The study further noted that, this explains why alcohol is considered a risk factor riders who spend long hours on the road. The current study has not shown association between alcohol use and accident involving commercial

motorcycle operators, possibly points to limitations inherent in it. On the other hand, the results could be an indication that those riders who consume alcohol or drugs and ride, possibly consume relatively small quantities of these products so that their judgments are not grossly impaired as they operate their motorcycles.

A study by Luchidio (2013) on the "impact of training commercial motorcycle operators and safety status in Kakamega County" noted that drunk driving / riding can make operators to make wrong judgment thus putting themselves and other road users in danger. Nyatundo (2014) also noted that, there is a very strong alcohol/substance influence on accident rates among commercial motorcycle operators in Kisii town. NTSA (2017) reported that, drunk riding among the commercial motorcycle operators is in Bungoma south sub county.

4.3.3 Age of Rider and Motorcycle Accident

To measure age of rider, surveyed respondents were asked to indicate their chronological ages which were categorized in age groups. A cross tabulation was carried out using chi square or Fisher's exact test, to test if there is significant difference between motorcycle accident involvement and age of rider.

Results in Table 4.4 reveals that, among surveyed respondents who have been involved in accident while riding, eighteen (29 per cent) were aged between 31 to 42 years compared with forty five (71 per cent) of commercial motorcycle riders who indicated they have never been involved in an accident while operating motorcycle. Twelve (23 per cent) of commercial motorcycle operators who had been involved in accident and forty one (77 per cent) of riders who had never been involved in an accident are in group 43 to 54 years. The riders who are aged over 54 years, seven (20 per cent) had been involved in accident

compared to twenty eight (80 per cent) of who had never been involved in an accident. Eight (57 per cent) of those who had been involved in accident and six (43 per cent) of those who had never been involved in accident were aged between 18 to 30 years.

Findings indicate that young commercial motorcycle operators in the town are more likely to be involved in an accident compared to their aged counterparts. However, the Fishers' exact test results indicate that there is no significant difference between those young riders and their aged riders with regard to accident involvement ($p = .091$; $N = 165$). Table 4.4 summarizes the association between age of rider and accident involving commercial motorcycle operators, in Migori town.

Table 4.4: Percentage Distribution of Rider Age by Motorcycle Accident Involvement

Age of rider (years)	Motorcycle Accident Involvement			
	Ever been involved		Never been involved	
	Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)
18 to 30	8	57.1	6	42.9
31 to 42	18	28.6	45	71.4
43 to 54	12	22.6	41	77.4
Over 54	7	20.0	28	80.0
Note : *Fisher's exact test (p = .091); N = 165; No missing case*				

Source: Survey Data, 2017

Against expectations, the results of bivariate analyses performed in this sub section revealed no association between age of rider and involvement. The results also show no significant difference between riders riding duration with regard to their involvement in accidents. This

situation can be explained by the fact that younger riders eventually advance in age and experience. Even as this happens, their past experiences with accidents remain an inalienable fact. As they advance in age and experience, their overall involvement in accidents can grow, but cannot decrease.

Perhaps the results would be different if the study limited data gathered on respondents' involvement in an accident to a short period in the past, a few months or years back, as opposed to considering the entire experience of a commercial motorcycle rider.

All the five interviewees indicated that lack of experience was the main cause of accidents involving motorcycle taxi operators, in Migori town. That many commercial motorcycle riders venture into the business without experience leading to accidents is evident in the words of one of the interviewee: *"Commercial motorcycle operators learn to ride in a matter of hours and then find a motorbike to ride….they make all manner of mistakes... Some even ride at night knowing that they have no confidence to control their bikes in the dark."* **(**KI – Traffic Police Officer; Migori town*)*.

It was noted by one respondent that those who are new to riding are prone to making some errors such as over braking, careless crossing of lanes, and making turns or crossing lanes without indicating, he emphasized, however, that, "*some new or inexperienced riders are consciously cautious to avoid accidents or situations that may lead them to accidents."* (KI – Traffic Police Officer, Migori town).

According to one interviewee, statistics from the county government of Migori indicated that younger riders get involved more in accidents compared to their older and more experienced counterparts. This view was supported by another interviewee who stated:

*"In our wards in the hospital, most commercial motorcycle riders who undergo treatment are young, and most of them are below 35 years of age." (*KI – Senior Medical Officer, Migori County Referral Hospital).

The results of the respondents mesh with the results of the interviews as well as several studies that show younger commercial motorcycle riders more likely to be involved in accidents compared to their older counterparts (Nyachieo, 2012). A study conducted in 2010 by Wilson and other scholars also noted that, motorcycle riders between the ages of 16 – 24 years are significantly overrepresented in accident; motorcycle riders between the ages of 30 and 50 years are significantly underrepresented in accident cases. These results are further confirmed by hospital statistics that show younger and less experienced riders to be the majority casualties in cases involving motorcycle accidents.

Findings of Glaiza et al. (2011) also support the findings of the current study. They found out that, young riders are usually involved in high speed while riding their motor cycles; this increases the risk of being involved in accident. Their study concluded that older riders might have encountered riding problems in the past, which imparted learning on the value of being cautious on the road. The case is likely to be same in Migori town where most young riders are involved in road accidents while riding. Another in agreement with the findings of the current study is by Sisimwa et al. (2014) that found out that, young riders in reproductive age group were most affected with reference to motorcycle accident.

The World Health Organization (WHO) links this trend to over speeding, under – cornering, and over braking by younger riders, all of which are potential causes of motorcycle accidents (WHO, 2009). A study by Kipngetich (2017) indicated that majority of the

respondents strongly agreed that there was general lack of riding experience among the riders in Bungoma south sub county, resulting young riders to accident.

4.3.4 Rider Compliance with Traffic Laws and Motorcycle Accidents

To measure rider compliance with traffic laws, surveyed respondents were asked to indicate in the structured questionnaire whether or not they do comply with traffic laws while operating their motorcycles in the town. A cross tabulation was performed using Chi square or Fisher's exact test, to test if there is significant difference between rider accident involvement and rider compliance with traffic laws as they operate in the town.

Study results in Table 4.5 reveals that ,among commercial motorcycle operators who had ever been involved in accident as they operate motorcycle, as well as those who had not been involved in an accident, seven (17 per cent) of them reported that they do comply with traffic laws guiding riders while riding. Among those who do comply with the traffic laws, thirty four (83 per cent) of them had never been involved in an accident as they ride in Migori town. The respondents who do not comply with traffic laws, thirty eight (31 per cent) had been involved in accident compared to eighty six (69 per cent) of the respondents who had never been involved in an accident while riding their motorcycles in Migori town. Statistics show no marked difference between commercial motorcycle operators who are compliance with traffic laws and those who do not comply with traffic laws with regard to motorcycle accident involvement in Migori town while riding.

The Chi – Square results indicate that there is no significant difference between those riders who do comply with traffic laws and those who do not comply with traffic laws while riding their motorbikes in the town with regard to motorcycle accident involvement ($\chi^2 = 2.861$;

df = 1; p = .091; N = 165). Table 4.5 summarizes the association between rider compliance with traffic laws and accident involving commercial motorcycle operators in Migori town.

Table 4.5: Percentage Distribution of Rider Compliance with Traffic Laws by Motorcycle Accident Involvement

Compliance with traffic laws	Motorcycle Accident Involvement			
	Ever been involved		Never been involved	
	Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)
Comply with traffic laws	7	17.1	34	82.9
Don't comply with traffic laws	38	30.6	86	69.4
Note : *Pearson Chi - square* (X^2) *= 2.861; df = 1; p = .091; N = 165; No missing case*				

Source: Survey Data, 2017

All the key informants engaged in IDIs indicated that, rider compliance with traffic laws was important to the safety of road users and that lack of it was a potential cause of accidents, in Migori town. Lack of compliance with traffic laws was noted to be a feature of motorcycle riders subjecting them to make illegal and careless moves on the road such as wrong overtaking and making U-turns. Even so, one of the interviewee emphasized that there is a big difference between being aware of traffic laws and obeying the traffic laws, adding that motorcycle operators should know the laws and obey traffic laws to make the alleviate or minimize to motorcycle road accidents.

The fact that most commercial motorcycle riders have no driving license from the National Transport and Safety Authority is both captured by the results of the survey and the statements of the interviewees. Among riders, non-compliance to traffic laws is commonly displayed by over speeding, overloading, and enter junctions carelessly, listening to loud music while riding, overtaking on the wrong side, using mobile phones while riding, driving under the influence of drugs and alcohol. In general the perceptions of commercial motorcycle riders and the interviewees of an existing relationship between conversance of traffic laws and accident rates are consistent with several studies. Chalya et al. (2012) noted that road traffic crashes are as a result of poor knowledge and practice of road safety measures in Tanzania. Kimwetich et al. (2012) indicated that the level of compliance and awareness of traffic laws among operators in Kitui town is low at only 2.2 per cent.

In spite of these perceptions, the survey indicated that there was no relationship between rider compliance with traffic rules and motorcycle involvement in accidents. The study also found no significant difference between those who comply with traffic laws and those who are compliant to with regard to their involvement in accidents. As noted by WHO (2013a) on a study conducted in Naivasha hospital, about 75 per cent of the patients admitted in the hospital were not wearing a helmet at the time of crash. Failure to wear helmet by motorcycle taxi operators is as low as 3 per cent (WHO, 2013a).

4.4 Collinearity Diagnosis

Multicollinearity is considered a disturbance that causes volatility in data (Allission, 1999). To assess the existence of multicollinearity problem among predictor variables, the tolerance values were estimated through collinearity diagnosis (see Table 4.6). Results in the Table 4.6 shows that the tolerance values of all the predictor variables are close to 1, indicating existence of very little multicollinearity problem (Mayers, 1990). According to Merard (2002) tolerance value below 0.1 indicates serious collinearity problem.

Table 4.6: Collinearity Diagnosis Results showing Tolerance Estimates of Predictor Variables

Predictor Variables				
	B	**S.E**	**V.I.F**	**Tolerance**
Rider training	-0.193	0.103	1.625	0.616
Rider alcohol use	-0.012	0.076	1.009	0.918
Age of rider	-0.037	0.035	1.032	0.969
Rider compliance with traffic laws	-0.006	0.093	1.422	0.703
Constant	**2.468**	**0.239**	-	-
Source : Survey Data , 2017				

4.5 Multivariate Analysis

This section examines factors associated with accidents involving commercial motorcycle operators. A binary logistic regression for accident involving motorcycle operators was performed. Multivariate analysis involved regression of accident involvement on four covariates. These included: rider formal training, rider alcohol use, age of rider, and rider compliance with traffic laws.

Table 4.7 presents estimates of odds ratio from logistic regression analysis of accident involving commercial motorcycle operators in Migori town. The finding reveals that most of the factors have insignificant effect on accident involving commercial motorcycle operators. Only possession of rider riding license and age of rider had significant effect on dependent variable.

Rider formal training had a statistically significant effect on accident involving commercial motorcycle operators' currently operating motorcycle in Migori town. Riders having formally trained how to operate a motorbike in a formal set up (driving school) are more likely never to be involved in an accident while riding than riders who were informally trained. For example, a rider who were formally trained was 10 times more likely not to be involved in accident than those who were informally trained. This finding is supported in literature from other studies that have indicated that; most accidents involving motorcycle operators in Nigeria are due to unlicensed and untrained riders. The study further noted that, some parts of Nigeria, Okada riders make their debut after a few hours of training session (Ayodele, 2009).

Literature suggests that due to little training, most riders flout the traffic rules and regulations which expose them to danger such as accidents as they ride on the roads (Odera, 2009). Rider use of alcohol while during riding hours was also found not significant factor of accident involving commercial motorcycle operators. This finding contradicts the finding of other studies in the literature. Alcohol use impairs judgment of riders / drivers leading to fatal or non-fatal accidents (Siskind et al., 2011). Use of alcohol and drugs always make people do just the opposite of what sober people would do on roads hence lead to accident cases (Sashoo, 2012). The odds of accident involving commercial motorcycle operators who drink alcohol during working hours was only 1.1 times higher than those riders who do not drink alcohol. This is an indication that the surveyed respondents, who indicated they do drink alcohol during riding time, use relatively small quantities which do not impair their judgment.

Age of rider was found to be significant factor of accident involving commercial motorcycle operators in Migori town. Conversely, the findings were mixed; with age group 18 to 30 years not having significant effect while age group 31 to 42 years and 43 to 54 years had significant effect. Riders in age group 18 to 30 years (relative to those aged over 54 years) were 4 times more likely to be involved in an accident , while those in age group 31 to 42 years were 6.1 times more likely to be involved in accident. The riders in age group 43 to 54 years were found to be 5.9 times more likely to be involved in accident compared to those riders aged over 54 years. Literature indicates that younger and less experienced commercial motorcycle operators to be more involved in accident compared to their older and more experienced counterparts (NTSA, 2015).

Rider compliance with traffic laws was found to be having insignificant effect on motorcycle accident involvement. This finding is not in support of other studies in literature. Over speeding, overloading, drinking during riding hours, listening to music installed in the motorcycles together cause road accidents (Mupimpila, 2008). Factors like bad road design and condition, rider attitude, errors made by other road users may lead to accidents. These other factors could have been at paly in the experiences of some respondents who have ever been involved in accident leading to the results obtained.

Table 4.7: Logistic Regression Results for Accidents Involving Commercial Motorcycle operators Currently Operating in Migori Town

	B	S.E	Sig.	Exp(B)
Rider Formal Training				
Informally trained [@]				
Formally trained	2.314	0.838	.006	10.115***
Rider alcohol use				
Don't use alcohol [@]				
Use alcohol	- .093	0.407	.819	.911
Age of rider (years)				
Over 54 [@]			.056	
18 to 30	1.296	0.673	.054	3.654
31 to 42	2.016	0.694	.009	6.061***
43 to 54	1.717	0.800	.018	5.857***
Rider compliance with traffic laws				
Don't comply with traffic laws [@]				
Do comply with traffic laws	- .010	0.559	.986	.990
Constant	- .686	0.678	.312	.504
-2 Log likelihood		178.967		
Cox & Snell R square		0.084		
Nagelkerke R square		0.121		

***Note: [@] Reference Category ; *** Statistically Significant at p ≤ .05* ; N = 165**

Source: Computed from Survey Data, 2017

4.6 Chapter Summary

This chapter has presented the study findings. It has described the findings and analyzed data in tables of frequency and percentage. The study found the following on background characteristics of the respondents in Migori town when the study was undertaken; majority (38.2 per cent) of the respondents were aged between 31 to 42 years. Many (57.1 per cent) aged between 18 to 30 years had ever been involved in accident. About 39 per cent of respondents had no education and 33.3 per cent had primary education. Many of the respondents (38.8 per cent) had worked for between 1 to 3 years at the time of the study.

The first objective was on rider formal training. The study found that, majority of the commercial riders (77.6 per cent) were not formally tarined to operate motorcycle. The informally trained riders, many (33.6 per cent) of them had ever been involved in motorcycle accident. Chi – square test found a significant difference between rider formal training and motorcycle accident. In a logit model, rider formal training was found to be a significant predictor.

The second objective was on rider alcohol use, 69.1 per cent of commercial riders use alcohol during working hours. The study revealed no marked difference between riders who use alcohol and those who do not use alcohol during working hours with regard to motorcycle accident. Chi – square test did not find a significant difference between rider alcohol use and motorcycle accident involvement. A logit model, also found that rider alcohol use was an insignificant predictor.

The third objective was on age of rider. The study found that majority of the commercial riders (60.9 per cent) were aged between 31 to 42 years at the time of study, with again

majority (57.1 per cent) aged between 18 to 30 years had ever been involved in accident. A binary logistic regression indicated that only commercial riders aged between 31 to 42 years and 43 to 54 years were predictors of motorcycle accident involvement.

The fourth objective was on rider compliance with traffic laws. The study found that, 75.2 per cent of the respondents did not comply with traffic laws while riding within Migori town. About 30 per cent of the riders who did not comply with traffic laws had ever been involved in motorcycle accident. A binary logistic regression revealed that rider compliance with traffic laws was not a significant predictor of motorcycle accident involvement. Chapter five presents summary , conclusions and recommendations.

CHAPTER 5: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.0 Introduction

This study explored factors associated with accidents involving commercial motorcycle operators in Migori town. The research objectives were to; determine the association between rider formal training and accidents involving commercial motorcycle operators in Migori town, determine the effect of rider alcohol use on accidents involving commercial motorcycle operators, determine the association between age of rider and accidents involving commercial motorcycle operators, and determine the association between rider compliance with traffic laws and accidents involving commercial motorcycle operators in the study area.

The purpose of this chapter was to present a summary of the study findings, draw conclusions and make recommendations for future programming and further research.

5.1 Summary

i) Rider formal training and motorcycle accident involvement

The study sought to determine the association between rider formal training and accidents involving commercial motorcycle operators in Migori town. It established that there was marked difference between the respondents who formally trained in a formal set up (driving school) and those who were informally trained (backstreet training) with regard to accident involvement.. The study found a statistically significant association between rider formal training and motorcycle accident involvement as indicated in Table 4.2 on page 51. Further, Binary Logistic Regression indicated that rider formal training was an important predictor of

motorcycle accident involvement (see table 4.7; page 68). A rider who formally trained how to operate a motorbike through a driving school was 10 times more likely not is involved in accident compared to their counterparts who were informally trained to ride a motorcycle.

ii) Rider alcohol use and motorcycle accident involvement

In trying to determine the association between rider alcohol use and accidents involving commercial motorcycle operators in Migori town, the study revealed no marked difference between riders who consume alcohol and those who do not consume alcohol while riding with reference to accident involvement. The study did not find a statistically significant association between rider alcohol use and motorcycle accident involvement as shown in Table 4.3 on page 55. Further, a Binary Logistic Regression result revealed that rider alcohol use had no significant effect in predicting motorcycle accident involvement (see table 4.7; page 68).

iii) Age of rider and motorcycle accident involvement

In an attempt to determine association between age of rider and accident involving commercial motorcycle operators, the results indicated that majority (57 per cent) of the respondents in age bracket 18 – 30 years are likely to be involved in accident compared to their counterparts aged over 54 years. Despite these findings, the study did not find a statistically significant association between age of rider and motorcycle accident involvement as illustrated in Table 4.4 on page 58. In addition, a Binary Logistic Regression result revealed that age of the rider had mixed result in predicting motorcycle accident involvement (see table 4.7; page 68).

iv) Compliance with traffic laws and motorcycle accident involvement

The study sought to determine association between rider compliance with traffic laws and accidents involving commercial motorcycle operators in Migori town. The findings indicate that there is no marked difference between riders who comply with traffic laws and those who were not compliant with traffic laws with regards to motorcycle accident involvement. The study did not find a statistically significant association between rider compliance with traffic laws and motorcycle accident involvement as revealed in Table 4.5 on page 62. Moreover, a Binary Logistic Regression also confirmed that rider compliance with traffic laws had insignificant effect in predicting motorcycle accident involvement (see table 4.7; page 68).

5.2 Conclusions

Based on the research findings and summary, the following conclusions were made on factors associated with accidents involving commercial motorcycle operators in Migori town. The conclusions were made as per the research objectives;

Objective One: To determine the association between rider formal training and accidents involving commercial motorcycle operators, the study concluded that rider formal training is important in reducing motorcycle related accidents.

Objective Two: To determine the effect of rider alcohol use on accidents involving commercial motorcycle operators, the study concluded that alcohol use had no association with motorcycle accident involvement. Despite non association, the variable should not be taken for granted because some studies indicate that alcohol use impairs judgment of riders making to lose control of their motorbikes hence cause accidents.

Objective Three: To determine the association between age of rider and accidents involving commercial motorcycle operators, study concluded that age of rider had association with motorcycle accident involvement. Particularly, young riders were more likely to be involved in accident unlike their aged counterparts.

Objective Four: To determine the association between rider compliance with traffic laws and accidents involving commercial motorcycle operators, the study concluded that riders who do comply with traffic laws are less likely to be involved in accident unlike those who do not comply with traffic laws while operating their motorbikes in Migori town.

5.3 Recommendations

5.3.1 Recommendations for Policy and programme

This study sought to explore factors associated with accidents involving commercial motorcycle operators. Based on the study findings, the following recommendations on policy and programme are presented as per the study objectives.

i) Rider formal training and motorcycle accident involvement

The study found that most riders were not formally trained. Also association between rider formal training and motorcycle accident involvement was revealed. The current study therefore recommended that, NTSA should ensure that existing and potential riders are in possession of genuine riding licenses. Further, to ensure the problem of inadequate training is tackled, driving schools should ensure that a rider trains for the stipulated time.

ii) **Rider alcohol use and motorcycle accident involvement**

Despite none association witnessed between rider alcohol uses, other studies revealed that rider alcohol use impairs their judgment making to lose control of their motorbikes hence cause accident. The current study recommends that Kenya National assembly (parliament) to amend the Blood Alcohol Content (BAC) Act for riders to help them reduce motorcycle related accidents.

iii) **Age of rider and motorcycle accident involvement**

The study found that age of rider was associated with motorcycle accident involvement. It established that young riders are likely to be involved in accident unlike their aged counterparts. The study therefore recommends that NTSA to promote motorcycle safety education and awareness to riders in general but young riders in particular, to make them operate their motorcycles cautiously , so as to reduce motorcycle accident involvement.

iv) **Rider compliance with traffic laws and motorcycle accident involvement**

The study found that rider compliance with traffic laws not associated with motorcycle accident involvement. Though, the current study recommends that the traffic police department should impose severe penalties for riders who violate traffic rules and regulations while riding. This is because other studies in the literature found that the variable is associated with motor cycle accident.

5.3.2 Recommendations for Further Research

Drawing from the findings of this study, the following recommendations are made for further research.

A study to be conducted which include all commercial motorcycle riders irrespective of their registration status with Sacco so as to give relatively large sample size to further examine the variables which are found to be statistically insignificant, since available literature from other studies has revealed that they are statistically significant.

There is also need to examine the contribution of intervening variables such as condition of weather, status of road and motor cycle mechanical conditions as they were assumed in this study.

It is also important to further investigate the study variables that showed no statistical significance in this study with a relatively large sample size in other areas so as to make generalization about them.

Further, there is need to conduct a study which integrates both the views of commercial motorcycle riders and their passengers to validate some of the factors found to be associated with accidents involving commercial motorcycle operators.

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APPENDICES

A1: Letter of Intent

Re: Request to carry out research in your stage.

This is to bring to your attention of my desire to conduct a study in your stage; some members of this were randomly sampled to be included in this study. The study will be on *Factors associated with accidents involving commercial motorcycle operators in Migori town, Kenya.* I am M.A Geography student at Rongo University and this study is part of my degree requirement.

Accompanying the letter, are research approvals from relevant offices. I am well versed with the ethical guidelines put forth by the Kenya government including the confidentiality of the information provided by respondents as well as their anonymity.

Thanks in advance.

Yours sincerely,

James Owino

A2: Consent Form

Hello,

I am James Owino, MA Geography student at Rongo University; currently working on Factors associated with accidents involving commercial motorcycle operators in Migori town. You were identified to take part in this study because you are one of the commercial motorcycle operators registered with Migori town Motorcycle operators Sacco Limited and currently riding in the town.

If you agree to take part in this study, I will ask you some questions with reference to rider formal training, rider alcohol use, rider riding experience and rider compliance with traffic laws. Kindly, take note that some questions may refer to your personal experience while other questions will be in reference to commercial motorcycle operators in general.

Your participation in this study in confidential. If your individual results are used discussed, your identity will be protected by using code name instead of real identities. Participation is voluntary. You do not need to answer questions you feel uncomfortable answering.

By signing this consent form, I confirm that I have read (listened) and understood the information presented in this form. If you consider participating in this study kindly sign because it is required for record keeping purpose.

Respondent signature..... *Date* ……

Research Assistant signature..... *Date* ……

A3 (i): Questionnaire for Commercial Motorcycle Operators

FACTORS ASSOCIATED WITH ACCIDENTS INVOLVING COMMERCIAL MOTORCYCLE OPERATORS IN MIGORI TOWN, KENYA

You are requested to take part in the above- stated study topic. If you accept to take part you will respond to questions on your personal traits and about accidents involving commercial motorcycle operators. The research assistant will explain to you upon request any question (s) which is not clear to you.

Please be assured that any information you have given will remain as confidential as possible and will help relevant agencies to curb motorcycle related accidents.

Background Characteristics of Respondents

S/N	Question	Coding Category
1	How old (Years) were you at your last birthday?	18 to 30.....61.00 31 to 42.....62.00 43 to 54.....63.00 Over 54.....64.00
2	What is your highest level of education?	No education.....1.00 Primary.....2.00 Secondary.....3.00 Tertiary.....4.00
3	For how long (Years) have you been operating commercial motorcycle operators taxi in Migori town?	Less than 1 .....71.00 1 to 3 .....72.00 4 to 6 .....73.00 Over 6 .....74.00
4	Have you ever been involved in an accident while riding a commercial motorcycle in Migori town?	Ever been Involved.....10.00 Never been involved....11.00

Rider Formal Training

S/N	Statement/Question	Coding Category
1	The main cause of motorcycle operators' accidents in Migori town is lack of proper formal rider training.	Strongly Disagree.....1.00 Disagree .....2.00 Neutral .....3.00 Agree .....4.00 Strongly Agree 5.00
2	Motorcycle operators who are properly trained are less often involved in road accident in Migori town.	Strongly Disagree.....1.00 Disagree .....2.00 Neutral .....3.00 Agree .....4.00 Strongly Agree 5.00
3	Do you possess a riding license?	Have .....21.00 Don't have.....22.00
4	Where did you train/learn how to ride a motorcycle?	Driving school .....31.00 Other places.....32.00

Rider Alcohol Use

S/N	Statement/Question	Coding Category
1	Motorcycle operators under influence of alcohol usually cause accident in Migori town.	Strongly Disagree.....1.00 Disagree .....2.00 Neutral .....3.00 Agree .....4.00 Strongly Agree 5.00
2	Motorcycle operators under influence of drugs fail to control their motorbikes hence in an accident in Migori town.	Strongly Disagree.....1.00 Disagree .....2.00 Neutral .....3.00 Agree .....4.00 Strongly Agree 5.00
3	Do you use alcohol during riding period?	Drink.....41.00 Don't drink.....42.00
4	Do you abuse drugs as you operate motorcycle?	Abuse.....51.00 Don't abuse.....52.00

Rider Age and Riding Experience

S/N	Statement	Coding Category
1	Those who have been riding motorcycle for long rarely get involve in road accidents in Migori town.	Strongly Disagree.....1.00 Disagree .....2.00 Neutral .....3.00 Agree .....4.00 Strongly Agree 5.00
2	Young riders in Migori town mostly get involved in road accidents.	Strongly Disagree.....1.00 Disagree .....2.00 Neutral .....3.00 Agree .....4.00 Strongly Agree 5.00
3	Most road accidents in Migori town are as a result of adequate experience among riders.	Strongly Disagree.....1.00 Disagree .....2.00 Neutral .....3.00 Agree .....4.00 Strongly Agree 5.00

Rider Compliance with Traffic Laws

S/N	Statement/Question	Coding Category
1	Most commercial motorcyclist's riders in Migori town are conversant of current traffic laws.	Strongly Disagree.....1.00 Disagree .....2.00 Neutral .....3.00 Agree .....4.00 Strongly Agree 5.00
2	Commercial motorcycle operators in Migori town do adhere to current traffic laws.	Strongly Disagree.....1.00 Disagree .....2.00 Neutral .....3.00 Agree .....4.00 Strongly Agree 5.00
3	As a commercial motorcyclist's taxi operator, are you conversant with current traffic laws?	Conversant .....81.00 Not conversant.....82.00
4	Do you always adhere to traffic laws when you ride motorcycle?	Adhere.....91.00 Don't adhere.....92.00

END

THANK YOU FOR YOUR TIME AND HONEST RESPONSES.

A 3(ii): Interview Guide for Key Informants

I am a student at Rongo University, School of Arts and Social Sciences; am carrying out a research about factors associated with accidents involving commercial motorcycle operators. Your honest responses as a person with expertise in this area will help commercial motorcycle operators and relevant agencies in curbing motorcycle accidents. If you accept to take part I would like to ask you a few questions with reference to accidents involving commercial motorcycle operators. Feel free to seek for clarification in case any question is not clear to you.

GUIDE QUESTIONS

1. Please tell me the rate of commercial motorcyclist's taxi operators' accident involvement in the town. (Probe, what is the major cause of accidents?)
2. In your opinion, what can be done to reduce involvement in accidents among commercial motorcycle operators in Migori town?
3. Does formal training of commercial motorcycle operators influence involvement in accidents in Migori town?
4. Do accidents caused by commercial motorcycle operators in Migori town are as a result of rider alcohol use / drug abuse?
5. If you try to remember, what is the contribution of rider inexperience among commercial motorcycle operators in Migori town on road accidents?
6. Are you in agreement that lack of conversance and non-compliance to traffic laws having a link with involvement in accidents among commercial motorcycle operators in Migori town?

A4 (i): Research Authorization Letter: Graduate School

RONGO UNIVERSITY

OFFICE OF THE DEAN

SCHOOL OF GRADUATE STUDIES

Tel. 0771349741

P.O. Box 103 - 40404
RONGO

Our Ref: **MGEO/1000/2014**

Date: Tuesday, May 30, 2017

The Chief Executive Officer,
National Commission for Science, Technology & Innovation,
Utalii House,
Off Uhuru Highway, Nairobi,
P.O Box 30623-00100,
Nairobi-KENYA.

Dear Sir,

RE: RESEARCH PERMIT FOR MR.JAMES OCHIENG' OWINO-MGEO/1000/2014

We wish to inform you that the above person is a bona fide graduate student of Rongo University in the School of Arts & Social Sciences pursuing a Master of Arts degree in Geography. He has been authorized by the University to undertake research titled; ***"Influence of Rider Characteristics on Accident Rates among Commercial Motorcyclists within Migori Town, Kenya"***

This is, therefore, to request the commission to issue him with a research permit to enable him proceed for field work.

Your assistance to her shall be highly appreciated.

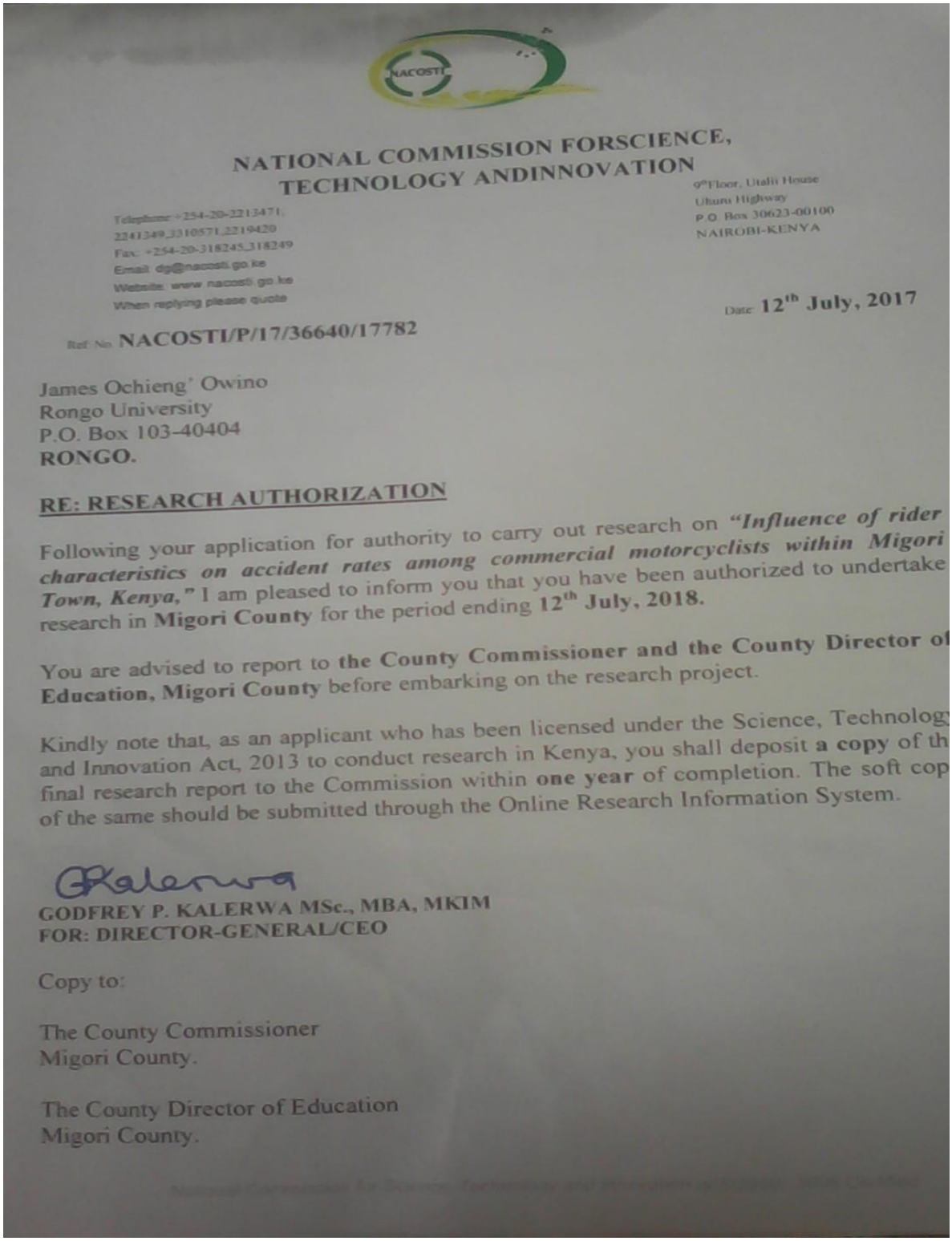
RONGO UNIVERSITY
THE DEAN
30 MAY 2017
SCHOOL OF GRADUATE STUDIES
P. O. BOX 103 - 40404, RONGO

Thank you,

Prof. Hezborn Kodero
DEAN, SCHOOL OF GRADUATE STUDIES

Copy to: Ag. Vice Chancellor
Ag. Deputy Vice Chancellor (Academic and Student Affairs).
Dean, School of Arts & Social Sciences.
HoD, Social Sciences & Humanities.

A4 (ii): Research Authorization Letter: NACOSTI



NATIONAL COMMISSION FORSCIENCE,
TECHNOLOGY ANDINNOVATION

Telephone: +254-20-2213471,
2241349,3310571,2219420
Fax: +254-20-318245,318249
Email: dg@nacosti.go.ke
Website: www.nacosti.go.ke
When replying please quote

9th Floor, Utalii House
Uhuru Highway
P.O. Box 30623-00100
NAIROBI-KENYA

Ref. No. **NACOSTI/P/17/36640/17782**

Date: **12th July, 2017**

James Ochieng' Owino
Rongo University
P.O. Box 103-40404
RONGO.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on ***"Influence of rider characteristics on accident rates among commercial motorcyclists within Migori Town, Kenya,"*** I am pleased to inform you that you have been authorized to undertake research in **Migori County** for the period ending **12th July, 2018.**

You are advised to report to **the County Commissioner and the County Director of Education, Migori County** before embarking on the research project.

Kindly note that, as an applicant who has been licensed under the Science, Technology and Innovation Act, 2013 to conduct research in Kenya, you shall deposit **a copy** of the final research report to the Commission within **one year** of completion. The soft copy of the same should be submitted through the Online Research Information System.

GODFREY P. KALERWA MSc., MBA, MKIM
FOR: DIRECTOR-GENERAL/CEO

Copy to:

The County Commissioner
Migori County.

The County Director of Education
Migori County.

A4 (iii): Research Permit for Investigator: NACOSTI

THIS IS TO CERTIFY THAT:
MR. JAMES OCHIENG OWINO
of RONGO UNIVERSITY, 0-40400
SUNA-MIGORI,has been permitted to
conduct research in *Migori County*

on the topic: *INFLUENCE OF RIDER CHARACTERISTICS ON ACCIDENT RATES AMONG COMMERCIAL MOTORCYCLISTS WITHIN MIGORI TOWN , KENYA*

for the period ending:
12th July,2018

Applicant's
Signature

Permit No : NACOSTI/P/17/36640/17782
Date Of Issue : 12th July,2017
Fee Recieved :Ksh 1000

Director General
National Commission for Science,
Technology & Innovation

CONDITIONS

1. The License is valid for the proposed research, research site specified period.
2. Both the Licence and any rights thereunder are non-transferable.
3. Upon request of the Commission, the Licensee shall submit a progress report.
4. The Licensee shall report to the County Director of Education and County Governor in the area of research before commencement of the research.
5. Excavation, filming and collection of specimens are subject to further permissions from relevant Government agencies.
6. This Licence does not give authority to transfer research materials.
7. The Licensee shall submit two (2) hard copies and upload a soft copy of their final report.
8. The Commission reserves the right to modify the conditions of this Licence including its cancellation without prior notice.

REPUBLIC OF KENYA

National Commission for Science,
Technology and Innovation

RESEARCH CLEARANCE
PERMIT

Serial No.A 14930

CONDITIONS: see back page

A4 (iv): Research Approval: CDE

MINISTRY OF EDUCATION
State Department of Education

Telephone: (059) 20420
Fax: 0592042O
When replying please
quote

COUNTY DIRECTOR OF EDUCATION
MIGORI COUNTY
P.O. Box 406-40400
SENA - MIGORI

REF: MIG/CDE/ADMN./1/VOL.III/ 157

DATE: 17th July, 2017

James Ochieng' Owino
Rongo University
P.O. Box 103-40404
RONGO

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on "*Influence of rider characteristics on accident rates rates among commercial motorcyclists within Migori Town*", I am pleased to inform you that you have been authorized to undertake research in Migori County for a period ending 12th July, 2018.

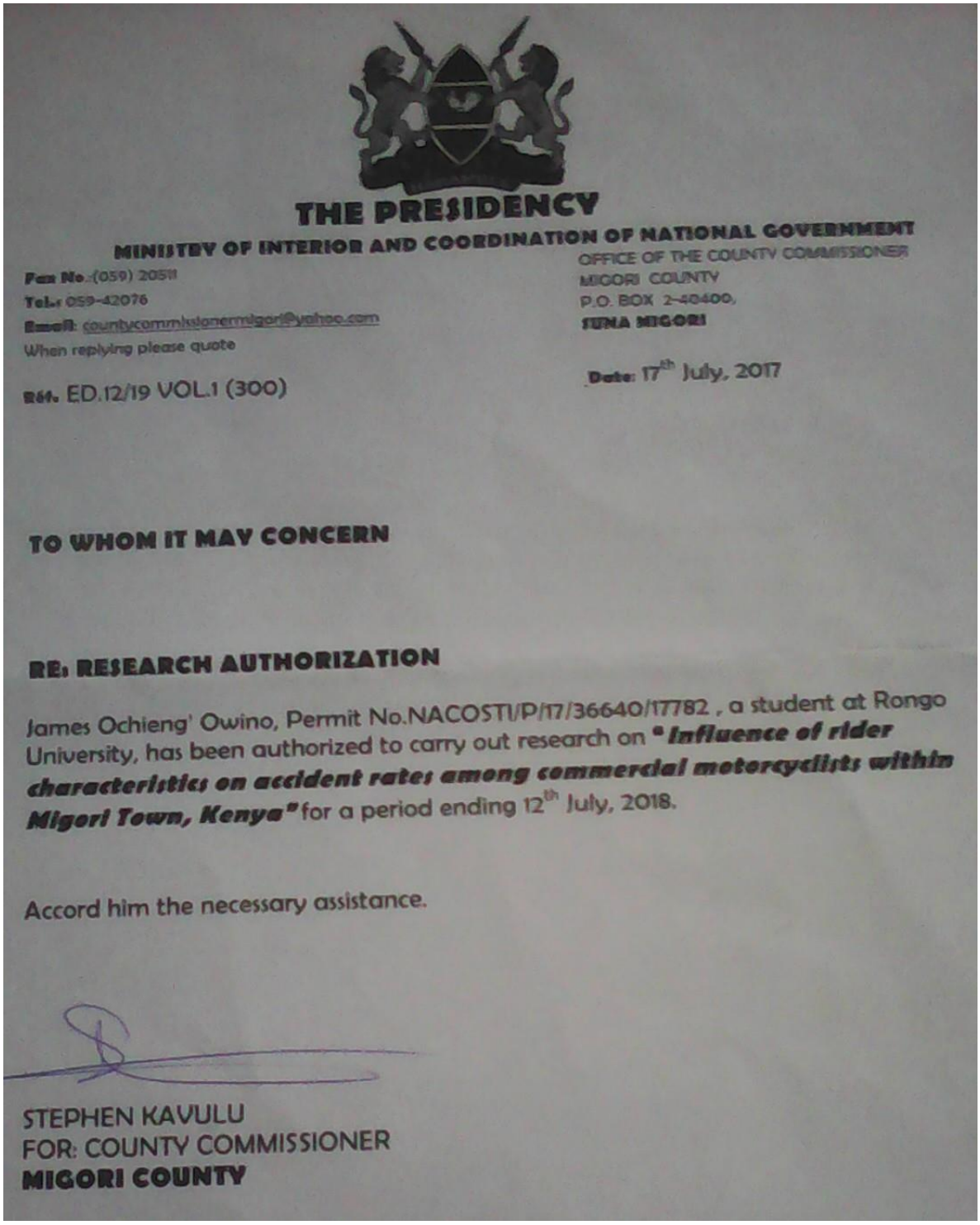
On completion of the research, you are expected to submit one hard copy and a soft copy of the research report/Thesis to this office.

Thank you.

FOR COUNTY DIRECTOR OF EDUCATION
17 JUL 2017
SIGN:.....

Luka Chebet
County Director of Education
MIGORI COUNTY

A4(v): Research Approval: CC



THE PRESIDENCY

MINISTRY OF INTERIOR AND COORDINATION OF NATIONAL GOVERNMENT

Fax No.(059) 20511
Tel.: 059-42076
Email: countycommissionermigori@yahoo.com
When replying please quote

OFFICE OF THE COUNTY COMMISSIONER
MIGORI COUNTY
P.O. BOX 2-40400,
SUNA MIGORI

Ref. ED.12/19 VOL.1 (300)

Date: 17th July, 2017

TO WHOM IT MAY CONCERN

RE: RESEARCH AUTHORIZATION

James Ochieng' Owino, Permit No.NACOSTI/P/17/36640/17782 , a student at Rongo University, has been authorized to carry out research on ***"Influence of rider characteristics on accident rates among commercial motorcyclists within Migori Town, Kenya"*** for a period ending 12th July, 2018.

Accord him the necessary assistance.

STEPHEN KAVULU
FOR: COUNTY COMMISSIONER
MIGORI COUNTY